Population Reports

Series L
Number 7
September 1988

ISSUES IN WORLD HEALTH

Population Information Program, Center for Communication Programs, Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202, USA

Mothers' Lives Matter: Maternal Health in the Community

Editors' Summary. More than half a million women, nearly all of them in the developing world, die each year in pregnancy or childbirth. This amounts to one every minute. Millions more suffer serious, sometimes permanent injuries. Much of this suffering and death could be prevented. Families, communities, and health professionals, working together, can make childbearing safer.

New attention is focusing on maternal health. While there is much more to women's health than pregnancy and childbirth, these are the greatest health risks many women face in their reproductive years. Also, many women will have few other contacts with modern health care. Thus maternal health care providers have an opportunity and a responsibility to promote substantial improvements in women's health.

Much current effort is focused on referral centers. Such centers can provide (1) emergency treatment when complications of labor or delivery develop unexpectedly at home, (2) a safer place to deliver for women likely to develop complications, and (3) treatment for problems in pregnancy.

Care in the Community

Attention must focus also on what can be done in the community. A woman's health throughout her life influences her risks in childbearing. Therefore efforts that can improve women's health at every stage of life are needed, and many of these can best be provided within each community.

For safer childbearing, women need:

- Prenatal screening and monitoring, including identifying those who need extra care at the referral center,
- Trained and supervised health care providers to attend deliveries at home,
- Ready transportation to a referral center if serious complications develop,
- Basic information about pregnancy and childbearing,
- Enough food throughout life, beginning in childhood,
- A start to childbearing only after women are fully grown,
- Family planning to help avoid dangerous pregnancies,
- Education, which improves women's status, delays marriage, and makes women more aware of their own health needs.

Most communities have traditional systems of care during labor and delivery. About 70 percent of all babies are delivered by traditional birth attendants (TBAs) or relatives. Even when modern, trained providers are available, many women prefer traditional care at delivery.

Cooperation and Training Needed

To make childbearing safer for more women, many maternal health programs cooperate with TBAs. Traditional birth attendants are learning how to deliver babies more safely. In some places, often working with formally trained providers, they help provide prenatal care.

Other programs are concentrating on bringing formally trained providers into the community. Modern health care professionals need training in maternal health care, especially for work in rural areas. Nurses and doctors need management and communication skills as well.

Cooperation between the community and the modern health care system is not easy. There are controversies about how much emphasis should go to preventive care and safer delivery in the community and how much should go to referral centers and emergency transportation. There also are controversies about what community-level practitioners—particularly TBAs—can do safely.

Community-oriented maternal health efforts are not yet widespread. Much needs to be tried. Much needs to be learned. Clearly, however, appropriate training, close supervision, and constant communication among all providers and with the community are necessary. So are the participation of the community from the start and understanding and respect on all sides. All this is possible with commitment and a renewed recognition that mothers' lives matter. **End of Editors' Summary.**

CONTENTS

How Many Mothers Die? 2
Why Is Pregnancy Risky? 3
Care for Girls and Women in the Community 7
Pregnancy Care in the Community 12
Labor and Delivery Care in the Community 15
Caring for Women in Referral Centers 20
Care After Delivery 21
Training for Better Maternal Health Care 22
Bibliography 26

A COMMUNITY TAKES ACTION

In two months in the spring of 1988 three women in a small Guinea-Bissau village died because they lacked basic maternal health care. First, a woman died after malaria caused her to miscarry. Just two weeks later a girl, 16 years old and pregnant for the first time, died from infection after a difficult birth. Not long after, a 30-year-old mother of four was in labor 17 hours before her family could find a car and a driver to take her to a hospital. They drove five hours, stopping at three hospitals, before finding a doctor. The woman died of infection three days after a cesarean section.

In an emergency meeting shortly after the third death, villagers decided they had to make childbearing safer in their community. They sent two men for primary nursing training and two women for training as birth attendants. With government help, they built a shed to provide office space and to store drugs. The government has promised to provide drugs free for six months and then at a reduced rate (122).

This village cannot take all the risk out of childbearing. No one can. Still, with some help, this community—and others like it—can make childbearing safer.

HOW MANY MOTHERS DIE?

Every minute another woman dies as a result of pregnancy—an estimated 500,000 deaths every year. Nearly all of these deaths occur in developing countries where women's health is poor and maternal health care is scarce.

Pregnancy-related complications cause one-quarter to one-half of deaths among women of reproductive age in developing countries. In some places pregnancy is the leading killer of women this age (123). Over her lifetime the average woman in the developing world except China faces one chance in 33 that pregnancy or childbirth will cause her death (see Figure 1).

How risky is any one pregnancy? While some pregnancies are more hazardous than others, for every 100,000 live births in the developing world except China, an estimated 550 women die. This ratio—the maternal mortality ratio—varies somewhat among developing regions. Over 600 mothers' deaths per 100,000 live births are estimated for Africa, over 400 for Asia, and nearly 300 for Latin America and the Caribbean. In contrast, the ratio for northern Europe is less than 10 per 100,000 (330).

These regional averages obscure great differences within regions and even within countries. In Asia, for example, Sri Lanka's maternal mortality ratio is below 95 deaths per 100,000 live births, while ratios for the rest of the Indian subcontinent average an estimated 650, among the highest regional rates in the world (417). In some rural areas of the world, rates are even higher. For example, a recent community study in a rural area of The Gambia found a maternal mortality ratio of 2,200, or about one woman dying for every 50 births (137).

Why does childbearing kill so many women in the developing world? Poor health and inadequate health services make each pregnancy dangerous, and many pregnancies multiply that risk. Until recently, these conditions also prevailed in what are now developed countries, and women faced a similar level of risk. For example, at the beginning of this century maternal mortality ratios for the United Kingdom and the United States were about 425 and 600, respectively (163). In Sweden maternal mortality ratios fell from about 570 in 1861 to about 225 in 1900, responding to increased training of rural midwives in safe delivery techniques (163). Today, with smaller families and maternal mortality ratios under 30, women in developed countries face only one chance in 1,500 of dying in pregnancy or childbirth.

In the developing world particularly, underreporting and misclassification of maternal deaths blur the picture of maternal mortality. The best figures are estimates based on a variety of sources (see Table 1, p. 6). No one source is always reliable. Vital statistics—when they exist—sometimes grossly underes-

timate maternal deaths. Hospital studies also tend to underestimate the number of deaths because many women die elsewhere. Community studies give a more complete picture but are costly. These studies gather information through household surveys and interviews with health care workers, community leaders, and family members (43, 135, 190, 388).

Improvements Made

While reducing maternal mortality is a difficult task for any country, some developing countries have made substantial improvements. For example:

- Sri Lanka, through nearly universal education, raised the average age at marriage and increased the use of family planning, thereby reducing the number of risky pregnancies in adolescents and in older women with many children (158). At the same time health care improved. The Sri Lankan maternal mortality ratio dropped from 555 per 100,000 in 1950 to 95 in 1980 (330).
- China lowered maternal mortality by substantially lowering birth rates, raising the age at marriage, and improving health care for pregnant women (69). The maternal mortality ratio, at 25, now rivals that of developed countries (417).
- Chile started a family planning program that increased contraceptive use and lowered abortion-related deaths from 118 per 100,000 live births in 1964 to 24 per 100,000 in 1979 (75, 256).

WHY IS PREGNANCY RISKY?

Why do women become ill and sometimes die in pregnancy and childbirth? Throughout the developing world most deaths can be attributed to one of three causes—hemorrhage, infection, or eclampsia. The complications that lead to these conditions vary from place to place, however. For example, where women give birth young, as in much of Africa, prolonged, obstructed labor leads to many deaths. Where family planning is not available, illegal abortion claims many lives.

These deaths are only part of the story. For every woman who dies, many others suffer from various illnesses—some long-term and disabling. How many suffer is not known. Nor has the toll on their lives been measured. Research has neglected these women. In fact, even how to study the matter is not clear. As a result, it is not known how many are unable to work, to care for their children, or to resume their normal lives after delivery.

Direct Causes of Death

Deaths from diseases or complications that occur only during pregnancy are usually called direct obstetric deaths. Although regional variations exist, hemorrhage, infection, eclampsia, abortion, and obstructed labor almost always are listed as the major direct causes of maternal death. (Of course, most deaths from abortion and prolonged and obstructed labor ultimately can be laid to hemorrhage or infection.) Ectopic pregnancy also often causes fatal bleeding. (See Table 1.)

Hemorrhage before or around childbirth or after abortion can be fatal in minutes if the bleeding is not stopped. Because hemorrhage often cannot be treated in the community, the danger is greatest for women who live far from health services that can provide surgery and transfusions. In one large study, for example, hemorrhage caused about 60 percent of maternal deaths in rural areas of China but only 25 percent in urban areas (431).

Hemorrhage is most common just after delivery. Postpartum hemorrhage often occurs because the uterus does not contract vigorously enough to stop bleeding or expel the placenta. This condition—uterine atony—is more common among women with many children. Other common causes of severe bleeding

Figure 1. A Woman's Lifetime Risk of Maternal Death, by Region

Around the world women's lifetime risk of dying from pregnancy-related causes differs 500-fold—from one in 20 in tropical Africa to 1 in 10,000 in northern Europe. Lifetime risk (R) is calculated using the maternal mortality ratio (MMR) and the total fertility rate (TFR). $R=1-(1-MMR)^{(1.2TFR)}$

Sources: Haub & Kent (153), Herz & Measham (159), WHO (417)

before, during, or after delivery are: prolonged labor, uterine rupture, tears in the cervix or vagina from traumatic deliveries or from poorly performed abortions, abnormal position of the placenta, or early separation of the placenta from the uterine wall. In hospital studies 2 to 3 percent of women hemorrhage during delivery (31, 97, 171).

Infection after childbirth or illegal abortion is common in developing countries. In large Nigerian and Kenyan studies, for example, 8 and 20 percent of women, respectively, developed postpartum upper genital tract infections (148, 298). Women who survive these infections face an increased risk of pelvic inflammatory disease later. They may also develop ectopic pregnancy, infertility, and chronic pelvic pain (63, 64, 248, 347, 413).

Unless they have sexually transmitted diseases (STDs), women with uncomplicated vaginal deliveries usually do not get infections (405). The chances of infection increase if labor and delivery are long or if the membranes rupture more than 24 hours before delivery. Frequent vaginal examinations, any surgery or use of instruments during labor and delivery, and lack of sterile technique also make infection more likely (53, 73, 108, 148, 254, 280, 295). Illegal and poorly performed abortions also often lead to infection.

Sexually transmitted diseases, particularly gonorrhea and chlamydial infections, often cause postpartum and postabortal infections (255, 286, 298, 386). Among Kenyan women gonococcal infection during pregnancy quadrupled the risk of postpartum upper genital tract infection (298). Studies in Africa report that up to one-fifth of pregnant or postpartum women are infected with gonorrhea or *Chlamydia trachomatis* (39, 227, 248, 268, 275, 298, 340, 343, 429).

Eclampsia and preeclampsia are poorly understood complications of pregnancy. Preeclampsia, the early stage of the disorder, is characterized by high blood pressure, fluid retention (edema), and protein in urine. It usually occurs in the second or third trimester of pregnancy. If untreated, preeclampsia may progress to eclampsia, with very high blood pressure, convulsions, or cerebral hemorrhage. Once eclampsia develops, immediate treatment and rapid delivery are needed. Even with treatment, however, the prognosis is poor. In developed and developing countries 5 to 17 percent of women with eclampsia die (28, 38, 84, 149, 258, 270, 314, 349, 405, 409). Those who survive may suffer such complications as paralysis, blindness, or chronic hypertension and kidney damage (305, 349).

Women pregnant for the first time are the most likely to develop preeclampsia and eclampsia. Preeclampsia affects from one to 31 percent of women having their first child, according to a recent 4-country study by the World Health Organization (WHO) (412). Heredity and diet may explain the wide variation. Eclampsia occurs in one percent or less of pregnant women (14, 28, 83, 258, 270, 313, 412).

Prolonged labor can kill through blood loss, dehydration, or metabolic disturbances (213, 244). Fatal bleeding can be due to a ruptured uterus, caused by persistent contractions. Even in hospitals mortality rates from ruptured uterus are high (105, 146, 435). When labor lasts too long, the baby must be delivered by forceps, cesarean section, or symphysiotomy (cutting the cartilage that joins the pelvic bones in order to widen the birth canal).

When has labor gone on too long? There is no standard answer. First births usually take longer than subsequent births. In general, however, a woman needs medical help if she has labored for more than 24 hours.

Prolonged labor is common in developing countries. It has various causes (see Figure 2). Particularly in Africa one of the most common is cephalopelvic disproportion—when the fetal head cannot pass through the pelvis—leading to obstructed labor (175). The woman's pelvis is too small because poor nutrition and stunting in childhood kept her pelvis from developing normally or because she became pregnant too young, before pelvic growth was complete (150, 252). Other causes of prolonged or obstructed labor are weak uterine contractions, which are particularly common among women who have had many children; deformity or abnormal position of the fetus; and abnormalities of the cervix or vagina, sometimes caused by female circumcision.

Illegal abortion leads to complications that cause 115,000 to 200,000 maternal deaths each year (329). Infection or hemor-

This issue of Population Reports was prepared by Cheryl Lettenmaier, R.N., M.P.H., Laurie Liskin, Sc.M., Cathleen A. Church, M.H.S., and John A. Harris. Ward Rinehart, Editor. Production by Merridy Gottlieb and Linda D. Sadler. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: Clayton Ajello, Laura Altobelli, E.M. Backett, Naomi Baumslag, William R. Beisel, Mark Belsey, Jane T. Bertrand, Sushum Bhatia, Larry L. Ewing, Eleanor E. Folta, Judith Fortney, Ronald H. Gray, Kelsey A. Harrison, Robert A. Hatcher, Carol Hermann, Roy Jacobstein, Samuel Kahn, Kathy Krasovec, Barbara Kwast, John Lawson, W. Henry Mosley, Dorothy L. Nortman, Bonnie Pedersen, Thomas Petrick, Barry M. Popkin, Allen Randlov, Roger W. Rochat, Judith P. Rooks, Allan G. Rosenfield, Erica Royston, Fred T. Sai, Diane Schwartz, Pramilla Senanayake, James Shelton, J. Joseph Speidel, Farhang Tahzib, Suzanne C. Thomas, Anne Tinker, José Villar, Gordon Wallace, Edward Wallach, A. Wasunna, and Beverly Winikoff. Some reviewers read portions of the manuscript; others, all.

Population Reports (USPS 063-150) is published five times a year (March, May, September, November, December) at 527 St. Paul Place, Baltimore, Maryland 21202, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second-class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202, USA.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the United States Agency for International Development.

Population Information Program
Center for Communication Programs
The Johns Hopkins School of Hygiene and Public Health

Phyllis T. Piotrow, Ph.D., Director, **Center for Communication Programs** and **Population Information Program**

Ward Rinehart, Deputy Director, Population Information Program, and Editor, **Population Reports**

Anne W. Compton, Associate Director for POPLINE computerized bibliographic services

Patrick L. Coleman, Deputy Director, **Center for Communication Programs** and Project Director, **Population Communication Services**, developing family planning communication strategies and materials

rhage from uterine or cervical lacerations causes most of these deaths. Severe illness and death sometimes occur after spontaneous abortions but far less often.

According to recent studies deaths from illegal abortion are common throughout the developing world. In Bangladesh, for example, an estimated 5,000 to 7,800 women die from illegal abortions each year (190, 246). Abortion causes about 25 percent of maternal deaths in cities as far apart as Addis Ababa, Ethiopia (203); Kuala Lumpur, Malaysia (3); Lusaka, Zambia (250); and 40 percent in Bogota, Colombia (435).

Ectopic pregnancy—implantation of a fertilized egg outside the uterus—can cause life-threatening hemorrhage. Surgery to stop bleeding is necessary. Many preventable deaths occur, however, because ectopic pregnancy is misdiagnosed or because women cannot get care as soon as symptoms begin (19, 56, 94, 127). African hospitals report 8 to 32 ectopic pregnancy admissions for every 1,000 deliveries (11, 15, 238, 284). Somewhat lower rates are reported in Asian and Near Eastern hospitals (18, 71, 152, 195).

Indirect Causes of Maternal Death or Illness

Conditions that worsen or prove fatal during pregnancy are usually called indirect causes of maternal death or illness. In developing countries common indirect causes of death are viral hepatitis, anemia, and cardiovascular disease.

Viral hepatitis progresses very rapidly in pregnant women, particularly in the third trimester of pregnancy. About 10 to 20 percent of cases die, due to liver failure or hemorrhage (37, 77, 185, 205, 367, 373, 405). Hepatitis is known to be a major cause of maternal deaths in China (70), Ethiopia (205), India (43, 311), and Nigeria (279) and in refugee camps in Somalia and Sudan (373).

Figure 2. Major Causes and Consequences of Prolonged or Obstructed Labor

Table 1. Causes of Maternal Deaths, Selected Community Studies, 1976-1985

Place & Date	Ref. No.	No. of Maternal Deaths[a]	Maternal Mortality Ratio per 100,000 Live Births	% of All Maternal Deaths Due to: Hemorrhage[b]	Postpartum Sepsis[c]	Pre-eclampsia/ Eclampsia	Abortion	Obstructed/ Prolonged Labor	Retained Placenta	Other & Unknown
Bangladesh, Tangail District, 1982-83	8	48	566	21	10	15	17	13	17	8
Bangladesh, Jamalpur District, 1982-83	190	58	623	10	17	21	21	10	7	14
Bangladesh, Matlab District, 1976-85	193	387	550	20	7	12	18	7	NR	36
Egypt, Menoufia, 1981-83	123	437[d]	190	30	10	5	4	NR	NR	51
Ethiopia, Addis Ababa, 1981-83	203	45	566	11	2	7	29	NR	NR	51
India, Anantapur District, 1984-85	43	270	837[e]	20	14	16	14	NR	NR	35
Indonesia, Bali 1980-82	123	295[d]	718	46	11	5	7	NR	NR	32
Tanzania, Southern Highlands Zone, 1983	304	115[d]	NR	28	16	3	17	5	NR	30

NOTE. Community studies gather information on maternal deaths from a variety of sources including household surveys; interviews with families, community leaders, and community health workers; hospital and clinic records; and vital statistics.
NR = not reported

[a]Includes direct and indirect causes of death
[b]Includes ruptured uterus and ectopic pregnancy, where reported
[c]Includes tetanus
[d]Includes nonobstetric deaths among pregnant women

Population Reports

Even a basic village health center such as this one in Burkina Faso can help to make childbearing safer. Simple prenatal care, family planning, health education, and a link with referral centers for women with emergencies all can be provided in the community. (D. Sokal, FHI)

Pregnant women also are more likely to contract other infectious diseases. Pregnancy reduces women's acquired immunity to malaria and tuberculosis. With malaria, infection is most likely during a woman's first pregnancy and is more likely after the twelfth week of pregnancy than before (49, 51, 132).

Anemia is common among all women but particularly among pregnant women. According to WHO estimates, three of every five pregnant women in developing countries except China are anemic—that is, their blood level of hemoglobin is less than 11g/dl(88). Previous menstrual bleeding, a diet lacking absorbable iron, and malaria cause most anemia in pregnant women. Anemic women are less able to resist infection and less able to survive hemorrhage or other complications of labor and delivery. In a 1982 study in 12 Indonesian hospitals and in an earlier study of 73,000 pregnancies in Malaysia, anemic women were four times as likely to die in childbirth as nonanemic women (72, 224). In addition to iron, shortages of other nutrients also are suspected of causing complications of labor and delivery (398).

Even normal pregnancy and childbirth put stress on the cardiovascular system. Thus they may be fatal to women with heart diseases. In a study in Menoufia, Egypt, cardiovascular disease caused 16 percent of maternal deaths. About half of these involved past rheumatic fever (123).

Chronic Conditions

In 1980 a study in one small Indian village found that, for every maternal death, 16 women suffered from illness during pregnancy, childbirth, or within six weeks after delivery (85). This may be the only study of its kind. The prevalence of illnesses during and after pregnancy and their impact on women's lives have not been adequately assessed. Some of these conditions are chronic.

Fistula. The most disabling of obstetric injuries are vaginal fistulas—abnormal connections between the vagina and bladder or between the vagina and rectum. Urine and/or feces leak continuously through the vagina, causing an odor and painful skin rashes on the vulva and perineum (214, 243, 266). Often women with fistulas are rejected by their husbands and shunned by their communities (106, 147, 199, 243, 264).

How often fistulas occur is not known. In several Nigerian hospitals less than one percent of all deliveries were complicated by fistula (105, 138). Of course, many women do not give birth in hospitals. In Zaria, Nigeria, alone an average of 130 women per year had surgery to correct fistulas between 1969 and 1980 (360). In Ethiopia an estimated 1,000 cases occur every year. A small hospital was built in the 1960s exclusively for fistula repair (143).

Prolonged and obstructed labor, particularly from cephalopelvic disproportion, causes most fistulas. Continuing pressure from the baby's head destroys the soft vaginal tissues. Very young women having their first child face the greatest risk. The traditional practice in parts of Africa of cutting the vagina also causes fistulas (360). These cuts, called *gishiri* cuts, are often performed to facilitate childbirth.

Although fistulas can be closed by surgery in 70 to 80 percent of first operations (106, 112, 188, 385), stenosis (narrowing) of the vagina may occur. This can make intercourse painful or impossible. Also, during later pregnancies these women are more likely to have urinary tract infections and possibly spontaneous abortions (243). They often must undergo cesarean section, with its risks. Fistulas sometimes reopen after childbirth (112).

Uterine prolapse. Repeated pregnancies and long labors stretch the pelvic ligaments supporting the uterus, contributing to prolapse of the uterus. In WHO studies in Colombia, Pakistan, the Philippines, and Syria, 3 to 25 percent of women under age 45 were found to suffer from some degree of prolapse (282, 283). Hard work, obesity, and chronic cough also contribute to uterine prolapse.

How do these conditions affect women's lives? The physical and social suffering from vaginal fistulas is obvious. The impact of other conditions—long and difficult labors, heavy bleeding before and after delivery, increased susceptibility to infectious disease—is harder to assess. At the least, such conditions decrease women's physical and mental energy. Women

Research Questions

- *What are the most practical methods for making a useful estimate of the number of maternal deaths in an area?*
- *How often are abortion-related deaths and other deaths in early pregnancy unreported?*
- *How many maternal deaths occur more than six weeks after delivery and thus are not counted?*
- *Among women of reproductive age, how does the number of maternal deaths in an area compare with the number of deaths due to other causes?*
- *What easily measured indicators can serve as proxies for maternal deaths, particularly for evaluating program impact?*
- *How do hospital statistics reflect the overall numbers and causes of maternal deaths in an area?*
- *How prevalent are pregnancy-related illnesses? How many women are left with chronic illnesses? How can this be studied?*
- *Why do maternal mortality and morbidity rates differ in places with similar socioeconomic conditions?*
- *What are the social and economic consequences of a mother's death or illness?*

may be less able to work, less able to solve problems, less able to be good mothers. Given the vital importance of women to their families and their communities and the need for women to take a more active role in development, any condition that keeps women from functioning to the best of their abilities demands attention.

CARE FOR GIRLS AND WOMEN IN THE COMMUNITY

Safer childbearing can begin in the community. Good care at delivery is required. So is good care before, during, and after pregnancy. In other words, safe childbearing requires a healthy woman. No health post or hospital alone can assure that. If good health is to be "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (406), it must begin where people live. Ideally, then, a maternal health program will (1) begin in the community, (2) pay attention to a woman's health throughout her lifetime, and (3) integrate traditional health care already practiced in the community with modern health care. Also, it must involve many fields: obstetrics, nutrition, family planning, control of sexually transmitted and other infectious diseases, health education and communication, and community development.

Such a program necessarily relies on personnel with different levels of training, experience, and responsibilities, possibly including:

- Trained traditional birth attendants or other traditional practitioners. Traditional practitioners—whose skills were learned entirely through apprenticeship and experience—are found in communities throughout the world. But more than their availability recommends training them. Their role in the community is long-established, part of its social network. Women often prefer care that is familiar over what outsiders offer.
- Assistant nurse-midwives—usually young, literate women who have trained for two years or less in the modern health care system. These professionals may work in the community either in place of or along with trained traditional practitioners.
- Midwives, nurses, nurse-midwives, and doctors—health care professionals who train and supervise assistant nurse-midwives and trained TBAs and who care for women with serious complications in referral centers.

Integrating traditional and modern health care systems is difficult. It calls on providers in both systems to develop new skills and new ways of working.

Much needs to be learned about this and all other ways of improving maternal health care in the community. New and existing prenatal and obstetric care programs need evaluation. At the same time, the many other ways that childbearing could be made safer need to be considered, including the care that girls and women need when they are not pregnant.

Women's Status

Over 60 percent of all women and girls in the world live in countries where their status is poor to extremely poor. These 1.4 billion women live under conditions that threaten their health (301). Their poor status compromises maternal health in many ways—girls often get less education than boys, less food, less health care; some cannot get health care, even in an emergency, without a man's permission; some are married young and begin bearing children too soon; some are circumcised in childhood. Improved status for women will not come quickly, and its pursuit will not substitute for providing better care now. In the long run, however, it will make an important difference to women's health.

Education. The education of women can make childbearing safer and improve the health of the entire family. In Zaria, Nigeria, for example, women with some formal education had a maternal mortality rate one-fourth that of women with no formal education (145). Why is this? While it is difficult to separate education from other aspects of socioeconomic status, it is clear that women with education are more likely to marry later, delay childbearing, use family planning, and seek prenatal care when pregnant (145, 204, 225, 257, 302). Educated women also are more likely to use obstetric services and avoid harmful traditional practices regarding pregnancy and childbearing. They also are able to feed and care for their families better.

Girls, however, often get less education than boys. In many societies few parents send their daughters to school. Many parents consider sons' education more important. Also, daughters often must stay home to care for younger children (271). Many girls are forced out of school by early marriage or pregnancy. For instance, secondary schools in Kenya lose 10 percent of their female students to pregnancy every year (191). Rarely can they return to their studies after their children are born.

Many women might be able to get more education if the community encouraged it. Both formal education for girls and adult literacy classes for adult women are needed. Since education is almost always a government function, government commitment and encouragement are a necessary first step.

Age at marriage. In many cultures early marriage and childbearing are the norm. Early marriage is most common in the Indian subcontinent and in Africa. It is least common in East Asia and Latin America (158).

Later marriage means a later, safer start to childbearing and lower lifetime fertility. On average, women who marry between ages 15 and 19 bear six or seven children—three or

A Colombian woman attends class surrounded by male schoolmates. Education improves women's earning power, access to health care, use of family planning, and nutrition—all vital to maternal health. Girls and women often cannot get schooling, however. (World Bank)

New Center, New Address for Population Reports

The Population Information Program (PIP), publisher of **Population Reports**, is now part of the newly formed Center for Communication Programs (CCP) in the Department of Population Dynamics of the Johns Hopkins School of Hygiene and Public Health. CCP was formed to bring together resources, skills, and new ideas in family planning and health communication and to apply them in programs worldwide. Phyllis T. Piotrow, Ph.D., is Director of the Center; Patrick Coleman is Deputy Director.

Along with PIP, major programs in the CCP include Population Communication Services (PCS), which provides technical assistance and support for the development of family planning communication strategies and materials; Family Health Services II, which assists the communication component of the Nigeria family planning program; and AIDSCOM, which, under a subcontract with the Academy for Educational Development, assists communication efforts to prevent the spread of acquired immune deficiency syndrome (AIDS). The various activities of CCP are funded largely by the United States Agency for International Development, with additional support from the United Nations Population Fund and private foundations.

PIP, PCS, and the rest of CCP has moved to new offices. The new address is:

Population Information Program
Center for Communication Programs
The Johns Hopkins University
527 St. Paul Place, Baltimore, MD 21202, USA

childbearing and high parity both increase a woman's chances of complications in childbearing (22) (see p. 10).

One way to raise age at marriage is to keep girls in school. For example, in Ghana a study found that most uneducated women married between ages 13 and 16, while most women with at least primary education waited until after age 18 (55). Worldwide, where the highest percentages of women are educated, the lowest percentages marry before age 20 (158).

Other possible efforts to raise age at marriage include legislating a higher minimum age at marriage and educating the community about the benefits of delayed marriage and childbearing. Legislation probably will not be successful, however, without commitment from community and political leaders.

Female circumcision. Female circumcision, or female genital mutilation, is a cultural practice that can profoundly affect the health of women. It is estimated that in Africa over 50 million women are circumcised. Less often, female circumcision is practiced in parts of the Near East, Asia, South America, and Australia (332). The procedure varies in severity from removing part of the outer genitals to infibulation, which closes the vaginal opening and is reported mainly in Somalia, Sudan, southern Egypt, parts of Ethiopia, Mali, Senegal, and Malaysia (377, 389). Female circumcision is often performed by a traditional community leader or healer under unclean conditions (23). There are no medical or health reasons to support the practice (411).

The complications of circumcision during childbirth can be serious, depending on the severity of the procedure (23, 231, 332, 377, 389). Prolonged labor is more common among women who have undergone genital excision (23). Vaginal delivery often tears the scar tissue caused by the circumcision wound, leading to infection, hemorrhage, or fistula (332, 377, 393). An infibulated woman always needs trained assistance during childbirth. Without someone to surgically reopen the vagina, the baby cannot be born, and both mother and child will die (389).

Where female circumcision is practiced, programs to improve maternal health must educate the entire community about its harmful effects. For example, in a pilot project in Sudan, village women, traditional midwives, and other influential persons elected representatives to attend a workshop on female circumcision. The representatives returned to their villages to teach other women. Women with health problems due to circumcision, teachers, and older female leaders also could be educated and encouraged to teach others (251). Male health workers also can be recruited to work with male community leaders, who may have the final decision concerning female circumcision (169). Community programs in Burkina Faso, Egypt, and Sudan, among others, have tried to reduce the practice. Both men and women resist change, however, and progress has been slow (251, 296).

Nutrition Throughout Life

Women need to eat well throughout their lives, not just when they are pregnant. Undernourishment during childhood can lead to stunted growth and a small or deformed birth canal, which in turn can cause obstructed labor. Also, undernourishment and deficiencies of certain nutrients during a woman's reproductive years are suspected of increasing her risk of infection or hemorrhage during pregnancy or delivery, of preeclampsia, and of preterm labor (before 37 weeks gestation). Surveys in over 80 developing countries have found that 20 to 45 percent of women ages 15 to 44 do not consume enough calories each day (142). Poor nutritional status is often passed from one generation to the next. Children of malnourished women are likely to be born at low weight (196).

Certainly females have no monopoly on hunger. Especially in poorer cultures, however, food is not distributed equally. In many societies females must eat after the males, and they receive less of the high-protein and high-calorie foods (68, 387).

There are many ways to attack the problem of women's poor nutrition at the community level:

- Nutrition and health education,
- Anemia screening and prevention,
- Iodine supplementation,
- Food supplementation,
- Community and household gardens.

Nutrition and health education. Community education is crucial to any effort to improve nutrition. Nutrition education programs, however, have tended to focus on infants and children rather than on women. Education can provide the skills, knowledge, and confidence women need to plan healthy diets and protect the health of their families. Education can help most, of course, when nutritious foods can be bought or grown. Even when good food is scarce, however, husbands and others can learn that women and girls need their fair share.

Health education and communication take many forms. Home visits, club meetings, community gatherings, employee workshops, and one-on-one conversations are a few possibilities (119). For example, in Sudan government-trained village midwives visited women's homes and taught them about child nutrition. Evaluation showed that the least educated mothers made the most use of their training (364). A similar approach might be used for maternal nutrition education.

Anemia screening and prevention. Anemia aggravates many of the complications of labor and delivery (see p. 6). Also, pregnancy greatly increases a woman's iron requirements. Therefore treating anemia before pregnancy is best. The easiest way to do this—if the food is available—is by adding meat and other iron-rich foods to women's and girls' diets. Iron fortification of flour and other processed food is another option in some areas. More often, however, maternal and child health programs have been able to serve only pregnant women, offering them iron and folic acid tablets (see p. 14).

Iodine supplements. Iodine deficiency is most common in reproductive-age women (292). It causes goiter (enlargement of the thyroid gland), hypothyroidism, infertility, and, in infants, cretinism (107).

There are two ways to prevent iodine deficiency: fortification of food items and supplementation of the diet. Fortification of salt is the most common. It is easy, costs little, and, where salt is widely sold, it is effective because most people eat it regularly. Many countries, including Argentina, Colombia, and Guatemala, have successful iodized salt programs (107).

Where fortifying foods is not feasible, supplementation with iodized oil, either injected or oral, should be considered. One injection prevents iodine-deficiency disorders for three to five years (119). An oral iodized oil is cheaper, however, easier for community workers to distribute, and appears to be just as effective (292). Iodized oil has been used successfully in several countries (107).

Food supplements. Community-based food supplementation programs to date have focused on the child. Most have given pregnant women and breastfeeding women protein and/or calorie supplements. Pregnant women have been given supplements largely to increase infant birth weight (217, 240, 366). Nearly all programs have been research or pilot projects because a large, ongoing effort would be quite expensive. They have not looked at changes in maternal morbidity or women's long-term nutritional status (142, 394).

Food supplementation programs face many difficulties besides high cost. For example, to economize, programs should focus on those most in need. Preliminary studies indicate that prepregnancy weight-for-height and changes in triceps skinfold in the second trimester of pregnancy can identify the women who would benefit most from supplementation (17, 216, 378, 398). At the same time, however, most women could benefit from more food—and not just during pregnancy. Feeding all women before their pregnancies would help them attain optimum prepregnancy weight, and supplementation after delivery would replace calories and nutrients lost during pregnancy and breastfeeding and can help build up fat reserves for the next pregnancy (59). Also, programs must identify an appropriate food supplement. It should supply what is missing from the diet, be inexpensive, locally available, simple to prepare, and tasty (366). A further problem is ensuring that women eat the supplement, not give it away. Even if women are watched to see that they eat the supplement, they may eat less at home (142).

Food production for home consumption. Women in Africa and Latin America have traditionally grown vegetables and spices.

Girls often get less food than boys. These are 2-year-old twins. The boy was nursed first and ate first. His sister got what was left. Malnourished girls face a greater risk of injury and death in childbirth later in life. (Balcomb, UNICEF)

The increasing commercialization of agriculture has reduced this practice (357). Women can improve their nutritional status by organizing community or home gardens to grow nutritious food for home consumption.

Family Planning

Pregancies are most dangerous for women who:

- Are too young (less than 18 years),
- Have had too many births (more than four),
- Have a medical or obstetric history that puts them at risk,
- Do not want another pregnancy and may resort to unsafe abortion.

Preventing these pregnancies can save women's lives. It is estimated that one-quarter to one-half of all maternal deaths worldwide would be prevented if women avoided all high-risk or all unwanted pregnancies (45, 232, 234, 318, 401).

Pregnancy is riskiest to very young women and to older women with many children (see **Population Reports**, *Healthier Mothers and Children Through Family Planning*, J-27, May-June 1984). Pregnancy is dangerous to young women—especially those in their early teens or chronically malnourished—because their pelvic growth is not complete (95, 252). These women may develop prolonged or obstructed labor.

High parity also increases a woman's risk in pregnancy. Women who have had more than four births are more likely to require delivery by cesarean section, forceps, or suction extraction (21, 128, 144). High-parity women also face a greater risk of antepartum and postpartum hemorrhage, anemia, malpresentation, and chronic conditions such as uterine prolapse, cervical erosion, and diabetes (21, 281, 432). For example, a large Sudanese study demonstrated that women with four or more children had the highest rates for every complication except preeclampsia, which is usually most common with first births (21).

Preexisting medical problems and a poor previous obstetric history also put women at high risk during pregnancy and delivery (see p. 12 and p. 14). These women should be alerted to the special danger they face in pregnancy and, if they want to avoid pregnancy, every effort should be made to provide them with family planning supplies and services.

Unwanted pregnancies often end in abortion—whether legal or illegal. Worldwide, 20 to 30 percent of all pregnancies end in induced abortions (315), and as many as 80 percent of these abortions are illegal (300). An estimated 115,000 to 200,000 women die each year from poorly performed abortions (see p. 4–5). Many of these deaths could be prevented if women were offered safe alternatives.

Women often resort to abortion when they do not have access to contraceptives. For example, a Bolivian study of 4,371 women with abortion complications in 1983–84 found that almost 30 percent had not used any contraception in the month before conception because they did not have enough information about family planning (24).

When family planning is available, there are fewer abortions and fewer abortion-related deaths. For example, when Chile began its family planning program in 1963, 3 percent of couples used contraceptives. By 1978 the percentage had increased to 23. During those same years abortion-related deaths dropped from 118 to 24 per 100,000 live births (117, 172, 256).

Although contraceptive use is increasing in many countries (225), many women who want to avoid pregnancy still do not use family planning. Recent Demographic and Health Surveys in 13 developing countries have found that 50 to 91 percent of married women did not want another pregnancy at that time. Some 24 to 97 percent of these women for whom data are available were not using contraception (see Table 2). Thus an important opportunity to improve maternal health lies in providing family planning to all women who want to avoid pregnancy.

Women often do not want another pregnancy soon after a previous delivery. While the adverse effects of short birth intervals on infant health have been well-documented in developing countries (79, 161, 162), evidence of effects on maternal health—referred to as the maternal depletion syndrome (179)—is weak and inconsistent (400). Studies to date have not found a strong association between specific nutritional deficiencies, protein-calorie malnutrition, and premature aging, on one hand, and closely spaced pregnancies, on the other (2, 400). The maternal depletion syndrome is difficult to study. The effects of many and closely spaced pregnancies are hard to separate from the effects of socioeconomic factors such as maternal education and income. Studies of birth intervals and women's health now underway in the Philippines and Guatemala may be able to take account of some of these problems (299).

Family planning in the community. For family planning to contribute as much as possible to maternal health, services must be offered to women where they live. Family planning can be

Table 2. Estimated Percentage of Married Women[a] Who Do Not Want Pregnancy Now But Are Not Using Family Planning, Demographic and Health Surveys, 1985-1988

Region, Country & Year	(A) % of Married Women Who Do Not Want Pregnancy Now[b]	(B) % of (A) Not Using Family Planning
AFRICA		
Liberia 1986	50	39
Morocco 1987	56	31
Nigeria, Ondo State 1986	58	97
Senegal 1986	58	37
ASIA		
Indonesia 1987	82	33
Sri Lanka 1987	84[c]	29
LATIN AMERICA AND THE CARIBBEAN		
Colombia 1986	77	24
Ecuador 1987	87	46
El Salvador 1985	91[d]	42
Paraguay 1987	63[e]	51
Peru 1987	90	45
Trinidad & Tobago 1987	65	28

NA=not available

[a]Ages 15-49 except 15-44 in Paraguay

[b]Except as noted, includes all women who want no more children or who want to postpone birth for at least two years

[c]Includes women undecided about how long to postpone pregnancy

[d]Includes women who want no more children for at least one year

[e]Includes all who do not want pregnancy now regardless of spacing interval desired

Sources: Demographic and Health Surveys (74, 80, 101, 104, 155, 259, 260, 269, 290, 354)

offered in the community in various ways. Community-based distribution (CBD) programs include:

- Community workers who visit households to offer services.
- A village-based supply managed by a community member.
- Outreach or mini-clinics located in villages or urban neighborhoods.
- Periodic visits by trained workers from outside the community.

Most community-based programs rely on nonprofessional providers (285). Operations research has shown that many different types of people can deliver family planning and other basic health services in the community (129). For example, the Oyo State CBD project in Nigeria trained both traditional birth attendants and male community health workers to provide family planning services. Women tended to seek advice from the TBAs, while men sought advice from the male workers (316). In many employment-based programs employee volunteers provide information and family planning supplies to their coworkers (see **Population Reports,** *Employment-Based Family Planning Programs*, J-34, September-October 1987).

Commercial outlets are the major source of some contraceptives, such as condoms. In a number of countries contraceptive social marketing programs offer contraceptives at subsidized prices through various commercial outlets (see **Population Reports**, *Contraceptive Social Marketing: Lessons from Experience*, J-30, July-August 1985).

Operations research around the world has demonstrated that CBD programs:

- Can increase contraceptive use, especially in rural areas.
- Will reach more couples when more methods are offered.
- Does not increase the health risks of oral contraceptive use.
- Can be provided at reasonable cost. (See **Population Reports**, *Operations Research: Lessons for Policy and Programs*, J-31, May-June 1986.)

Sexually Transmitted Diseases

Sexually transmitted diseases should be treated before a woman becomes pregnant to avoid (1) chronic pain and infertility; (2) complications of pregnancy such as ectopic pregnancy, spontaneous abortion, and premature onset of labor (12); (3) postpartum infection, which can cause infertility or death (298); and (4) infection of the infant.

Better than treatment is prevention. A mutually faithful, long-term sexual relationship with one partner is the best protection. Women at risk of acquiring an STD, however, can protect themselves by insisting that their partners use condoms and, preferably, by using barrier contraceptive methods themselves as well (64, 245, 347). Pregnant women at risk of STD infection also should insist that their partners use condoms to protect them and the child.

Prompt and adequate treatment of infected persons and their sexual partners can interrupt the spread of disease within a community and stop progression of the disease in the individual (170, 430). Education of both men and women is crucial. Most people do not know how sexually transmitted diseases are spread or what their symptoms and complications are (347). Women often are especially ill-informed and may need to be addressed specifically. For example, when women were addressed in a community education program in Madras, India, the percentage who could identify signs and symptoms of sexually transmitted diseases increased from 23 to 86 percent over three years (353). Additionally, the social stigma of a sexually transmitted disease, which often discourages women from seeking treatment, must be addressed (430).

Women who are healthy and well-nourished, who plan their pregnancies, and who get competent care during pregnancy, labor, and delivery are more likely to have safe deliveries and healthy infants. (Wolff, World Bank)

AIDS and maternal health. AIDS—acquired immune deficiency syndrome—is a new, deadly, and rapidly spreading sexually transmitted disease. Unlike most other sexually transmitted diseases, there is no cure for AIDS. Human immunodeficiency virus (HIV), which causes AIDS, is infecting increasing numbers of young women in the prime childbearing ages. Once infected, a pregnant woman—with or without symptoms—passes the virus to her child, before or during delivery, in 30 to 60 percent of cases (126). Among pregnant women, the highest reported rate of HIV infection is nearly one in every four, in a hospital in Kampala, Uganda, in 1987 (62).

Recent studies have eased concerns that pregnancy would speed the progression of disease in women infected with HIV. In the US and Europe infected women—primarily intravenous drug users—are no more likely to develop symptoms of infection or AIDS during pregnancy than infected women who are not pregnant (41, 180, 228, 363). Anecdotal reports from Africa

Research Questions

- *What are the best ways to make health services easily accessible to nonpregnant women?*
- *Is there a maternal depletion syndrome? Are closely spaced pregnancies and extended breastfeeding harmful to women? In what ways?*
- *Are there practical ways that community-level providers can identify women before pregnancy who are likely to develop complications during pregnancy or labor?*
- *How do a woman's health and nutritional status before pregnancy affect her risks of complications during pregnancy or delivery?*
- *To what extent does family planning prevent maternal deaths from childbirth and illegal abortion?*
- *How often does female circumcision complicate labor and delivery?*
- *What can health services do to stop the practice of female circumcision?*

suggest the same. Prospective studies comparing pregnant and nonpregnant infected women are now underway in several African countries (133).

The measures used to prevent other STDs can help to control AIDS. Anyone infected with HIV who continues to have sexual intercourse must use condoms consistently. They can also use another reliable contraceptive method to provide extra protection against pregnancy and thus avoid passing the virus to their children. Pregnant women who are at risk of HIV infection should insist on condom use to protect both themselves and their children.

Signs of Serious Obstetric Complications

Treating serious obstetric complications early can save many women's lives. All community-level health care providers and all pregnant women need to know danger signs in pregnancy and childbirth. They also need to know that women who have had difficult deliveries, who have had cesarean sections, or who have had extensive circumcision (infibulation) should deliver with the help of a trained nurse-midwife or doctor.

If women have any of the following signs or symptoms, they should see a trained nurse-midwife or doctor immediately:

During Pregnancy

- Unusually heavy or smelly vaginal discharge.
- Very bad headaches, dizziness, fatigue, or trouble breathing.
- Bleeding from the vagina (antepartum hemorrhage).
- Swollen hands and face (edema).
- No signs of labor more than one day after waters break (premature rupture of the membranes).
- Fits (eclampsia).

During Labor

- Labor lasting more than one day and one night (prolonged labor).
- Fits (eclampsia).
- Fetus not in the usual head-down position (abnormal presentation).
- Umbilical cord hanging into the vagina (prolapsed cord).
- Gushing, bright red blood from the vagina (hemorrhage).

After Delivery

- Not all of the placenta comes out (retained placenta).
- Unusually heavy or smelly vaginal discharge (infection).
- Bright red blood from the vagina for more than seven days.
- Fits (eclampsia).
- Chills and fever (infection).
- Pain in the belly (infection).
- Very sore, swollen breasts with red streaks (mastitis).

Population Reports

PREGNANCY CARE IN THE COMMUNITY

Her own community is often the best place for a woman to receive basic care during pregnancy. Community services are the most accessible. Also, the most important tasks can be done simply and without complex equipment. Furthermore, most communities already have some form of pregnancy care, provided by traditional practitioners. New programs can gain an advantage by working with these traditional practitioners, who already have the trust of local women.

Direct evidence on the effectiveness of community-level pregnancy care is scarce. Some of the most important prenatal services performed in clinics and hospitals, however, are clearly feasible in the community using simple, low-cost procedures. Depending on the resources, personnel, and facilities available, these services can be as simple as measuring a woman's height against a mark on a wall or as technical as testing for protein in urine with a dipstick. With brief training and periodic supervision, community workers can:

- Screen pregnant women and refer women at high-risk of complications in pregnancy or delivery to centers where they can receive special care,
- Monitor pregnancy and treat or refer any problems that arise,
- Inform women and the community about health and family planning.

Competent pregnancy care, whether in the community or in a clinic, helps women have safer pregnancies and healthier babies. For example, in 12 Indonesian hospitals women who had no pregnancy care were over five times more likely to die during labor and delivery than women who had visited a prenatal clinic (72). Researchers found a similar difference in Addis Ababa, Ethiopia (204). Also, women who receive pregnancy care are less likely to have low birth weight babies or perinatal deaths than women with no care during pregnancy (93, 204, 338). In fact, higher birth weights and better child survival, not better maternal health, have been the main reasons for implementing prenatal care and thus the chief measures of its success.

Because women who use health services tend to be more educated and wealthier than those who do not (see box, pp. 16-17), they may be healthier and have healthier babies even without pregnancy care (257). A study in Accra, Ghana, however, found that, among women with equal education, those who received pregnancy care were less likely to miscarry than those who had no care (175).

Screening for High Risk

Community health workers often can predict which pregnant women will develop complications. A pregnant woman should be screened during her first contact with the health care system, as early in the pregnancy as possible. This allows time for treatment, referral, or transportation arrangements.

Screening procedures—which usually involve an examination and taking a reproductive history (see box, p. 14)—must be tailored to the workers who use them. Examination and history-taking procedures can range in complexity from asking whether a woman has ever had a difficult pregnancy or delivery to filling out a complex list of weighted risk factors (221, 272, 392). Several organizations are developing pictorial

record cards to help nonliterate health care workers identify all risk factors (65, 223, 272, 424).

Risk of obstructed labor is easiest to detect: a woman's height suggests whether the birth canal is large enough to deliver a baby (252, 327, 352). For example, in Sierra Leone women under 60 inches tall who were pregnant for the first time were urged to give birth in a hospital or health center. This criterion identified 85 percent of cases of obstructed labor. Half of the women referred for hospital birth did in fact develop obstructed labor (5). Programs must decide what is the minimum safe height based on the pattern of obstructed labor in their area. Foot size has also been used as a risk indicator, but its accuracy is still in question (125, 230).

Programs must choose referral criteria that give first priority to those who most need care. If criteria are too broad and too many women are sent to referral centers, those most in need may find all the places taken. For instance, in some places, if a program referred all first pregnancies and all women with more than four children, half of all pregnant women would be referred (423). Even if resources are available, too-sensitive screening criteria may be unwise. Women may resent traveling to a hospital for what turns out to be a normal birth (4).

During a woman's first prenatal contact with health workers, she should be asked if she is immunized against tetanus. If she is not, she should be immunized at once. If possible, community health programs should offer tetanus immunization to all women whether they are pregnant or not. Where health care is scarce, however, pregnancy care may be one of a woman's few opportunities for immunization.

Simple but important means of monitoring pregnancy, such as weighing, can be used in community as well as clinic. (Schytte, UNICEF)

Pregnancy Monitoring

Community health workers can monitor the progress of pregnancy and identify conditions if they arise. How many visits are needed is not known, but, clearly, repeated contacts are best. Thus trained traditional birth attendants (TBAs) or other local residents who can make home visits may be well-suited for the task. Also, many monitoring functions can be performed with minimal training. Community health workers can check for and treat or refer women with:

- Anemia,
- Preeclampsia,
- Sexually transmitted diseases and other infections,
- Abnormal fundal height.

International Efforts for Safer Motherhood

Many development assistance organizations large and small have expanded their work to make motherhood safer and have pledged more technical assistance and financial support for developing-country programs. In addition, these organizations sponsored two major conferences in Nairobi, Kenya, in 1987—the International Safe Motherhood Conference and the International Conference on Better Health for Women and Children through Family Planning.

The World Health Organization (WHO) established the Safe Motherhood Initiative in 1987 to fund short-term operations research on maternal health measures. WHO invites research proposals from local or national governments, universities, and nongovernmental organizations such as women's groups, mission hospitals, and health care providers' associations. Proposed research must be related to improving access to prenatal and delivery care and to improving the quality of care. Up to $40,000 (US) will be available for each project or phase of a project. WHO also will provide technical assistance for planning and analysis. The World Bank and the United Nations Development Program each have pledged $1,000,000 (US), and the Rockefeller Foundation, $500,000 to the Safe Motherhood Initiative.

The World Bank plans to double its lending for population, health, and nutrition projects to a total of about $500 million (US) per year by 1990 (355). A portion of this money will go toward country workshops and programs to prevent maternal deaths. About 15 regional or national conferences involving almost 75 countries are planned. For fiscal years 1987 and 1988 the World Bank is financing a variety of activities including projects that focus on women's health in nine countries. Some of the activities planned involve increasing access to family planning and prenatal and postpartum care, training nurse-midwives and traditional birth attendants, and providing tetanus toxoid and other medicines to maternal and child health clinics.

The United States Agency for International Development (US AID), a major donor to the conference on Better Health for Women and Children through Family Planning, is supporting the 5-year, $17.5 million (US) Maternal and Neonatal Health and Nutrition Project. Funded through the Office of Health in the Science and Technology Bureau, the Project is a broad, integrated program of health system support, applied research, and information dissemination. The focus is on services delivered to women and their families at the community and primary health care level and will focus on intensive development and evaluation of these services in up to five countries. Field activities are to begin in 1989. US AID also has funded a 2-year, $2 million program with the International Center for Research on Women, which now supports 20 maternal health and nutrition research projects in developing countries.

Many private foundations also are playing major roles in promoting safer motherhood. Among those contributing to maternal health research are the Carnegie Foundation, Mellon Foundation, Ford Foundation, Rockefeller Foundation, and the Pew Charitable Trusts.

Anemia. Community providers can carry iron and folic acid tablets—which are inexpensive and lightweight—and dispense them to anemic women. For example, in six months community workers in a pilot program in India reduced the prevalence of anemia from 66 to 20 percent of women delivering. Because anemia is so common, maternal health programs should consider providing routine iron supplements to all pregnant women.

Iron supplementation has many problems, however. Women must take tablets—usually 36 to 74 mg iron three times a day (46)—for at least 8 weeks and sometimes as long as 16 weeks before hemoglobin levels rise (88, 121, 174). Also, iron often causes gastrointestinal side effects. Because of the demanding regimen, the lack of immediate and obvious beneficial effects, and the side effects, many women do not take all the tablets. Women should be told in advance about possible side effects and that these side effects often diminish over time (273).

Research is underway on an inexpensive, easily made capsule that releases small amounts of iron over 8 to 10 hours. Therefore side effects are fewer. Also, women need to take only one capsule per day (184).

Pregnant women are more susceptible to malaria, which can cause or aggravate anemia. Where malaria is common, women should begin taking preventive drugs as soon as they know that they are pregnant (49). At present, chloroquine is the only antimalarial drug known to be safe for the fetus. Researchers are testing new drugs for chloroquine-resistant areas (226). Where cloroquine works, it works quickly and with few side effects. It is inexpensive and easy to dispense (194). Often, however, pregnant women do not take the recommended doses because they feel well and because they are concerned that any drug will harm their babies (50).

Preeclampsia. Health care providers should suspect preeclampsia when a woman has swollen hands and face, severe headaches, vomiting late in pregnancy, dizziness, or blurred vision. If TBAs note any of these symptoms, they should refer the woman to an assistant nurse-midwife, who can check for high blood pressure and protein in the urine. Rising blood pressure means that treatment and possibly hospitalization are necessary, especially when protein is found in the urine. Monitoring for preeclampsia is most important during the first pregnancy and in the last three months of all pregnancies (see p. 4).

Infections. If community providers examine women, they can detect signs of sexually transmitted diseases and see that women are treated. While these diseases often produce no symptoms, foul-smelling vaginal discharges suggest gonorrhea or chlamydial infections, the most common sexually transmitted diseases. Vaginal sores may be signs of syphilis, herpes, or chancroid (263, 326).

Pregnancy also can awaken an inactive tuberculosis infection (215). Therefore community health workers should refer for testing pregnant women who have a persistent cough and fever.

Fundal height. Accurate fundal height measurements—the distance from the symphysis pubis to the top of the uterus—can help health workers discover multiple pregnancies or a fetus that is growing too slowly. In either case the woman needs special care. The worker compares the growth of woman's uterus

Screening and Monitoring Pregnant Women in the Community

Screening and monitoring during pregnancy should cover as many of these basic points as possible.

Screening

History

How old are you? Women at the extremes of reproductive age face a higher risk of complications than women in their 20s.

How many pregnancies have you had? Women having their first pregnancies and women with more than four pregnancies are at greater risk than women with two to four pregnancies.

Have you ever had a difficult pregnancy? Women with a history of abortion, stillbirth, low birth weight, twins, heavy bleeding during pregnancy or after delivery, severe anemia, or operative delivery may face high risk.

Do you have tuberculosis, hepatitis, diabetes, high blood pressure, or heart disease? The combined stress of any of these diseases and pregnancy means a woman needs special care.

Examinations

Height. Short women may be at risk of obstructed labor.

Weight. Women who weigh too little may lack sufficient nutritional reserves for a healthy pregnancy.

Anemia tests. Anemic women are less likely to survive blood loss.

Monitoring

Fundal height. Abnormal fundal height can indicate twins or abnormal fetal growth.

Weight. Weight loss, insufficient weight gain, and extreme weight gain are potentially hazardous.

Anemia. Anemia can aggravate complications.

Swelling. Somewhat swollen ankles are normal in pregnancy, but swelling of the hands and face can indicate preeclampsia.

Protein in urine. Protein in a woman's urine, which can be measured with a dipstick test, also can indicate preeclampsia.

Blood pressure. Likewise, rising blood pressure signals preeclampsia.

Presentation of the fetus. A malpresented fetus can cause obstructed labor.

Fetal movement. If the fetus stops moving, the pregnancy is in danger.

Bleeding from the vagina. Bleeding, especially late in pregnancy, means a woman should get to a hospital or health center quickly.

Research Questions

- *What components of pregnancy care most effectively prevent maternal illness and death?*
- *How many prenatal visits are needed? What is the best schedule for visits?*
- *What factors—cultural, programmatic, and economic—keep women from getting modern maternal health care?*
- *What makes a program successful in attracting and satisfying clients?*
- *What simple tests can community-level workers use to screen and monitor pregnant women? Which tests detect the most women at high risk?*
- *Can trained traditional practitioners provide pregnancy care in the community as effectively as auxiliary nurse-midwives or nurses?*
- *How can community organizations help encourage and provide pregnancy care?*
- *Is foot size as accurate as height for predicting obstructed labor?*
- *How can community-level providers prevent eclampsia?*
- *Is preeclampsia/eclampsia related to diet?*
- *How important for the woman is her weight gain during pregnancy? How many calories does a woman need during pregnancy?*
- *Does food supplementation during pregnancy benefit the mother's nutritional status and health?*
- *Do local customs interfere with good nutrition during pregnancy?*

against a standard chart. Thus a worker who can read a simple chart is needed. Workers can use a measuring tape or a knotted string to measure fundal height (178). To be effective, the process requires an accurate estimate of the pregnancy's duration—often a difficult task—and a locally or regionally produced standard fetal growth chart (32). Alternatively, if workers assume that a pregnancy is normal, they can use fundal height to estimate when a woman will give birth.

Education During Pregnancy

Prenatal education gives women information that they need to help themselves have a safe pregnancy. Community health care providers and the mass media can tell women and their families about:

The signs of a high-risk pregnancy. Providers should teach women what to expect in a normal pregnancy and to get help if warning signs appear (see box, p. 12).

Preparing for birth. Providers can help pregnant women plan where they will give birth, who will be present, and who will provide emergency transportation and treatment if needed. The woman and her family should make sure clean water, a clean blanket or sheet, and clean clothing for the woman and her baby are available.

Proper diet. While there is no doubt that nutritional requirements rise during pregnancy, there is still considerable debate over how much more food pregnant women need and how much weight they should gain during pregnancy (99, 167, 408). Weight gain is important, however, and providers should tell pregnant women to eat more than usual, and which local foods will provide sufficient nutrients. Providers should discourage clearly harmful activities—such as smoking, drinking, chewing betel, and avoiding nutritious foods—but should avoid tampering with local customs that are not harmful. Practices that may appear irrelevant in medical terms may nonetheless give the woman a sense of security and comfort (44).

Physical activity. Providers should give women simple, locally produced guidelines on how much physical activity is safe during pregnancy. For example, a program might suggest that women more than six months pregnant should not walk more than an hour at a time or do any heavy lifting.

Relieving morning sickness, heartburn, and backache. A woman who gets good advice on how to relieve discomfort early in pregnancy will look to the same source for other information later (168).

Family planning and breastfeeding. Community-level providers can discuss and encourage family planning during prenatal visits (42, 350). Providers also should encourage breastfeeding because it has substantial benefits for child health and birth spacing.

CARE DURING LABOR AND DELIVERY

The care women receive during labor and delivery often determines whether they live or die. Proper care can virtually eliminate postpartum infection and prevent many deaths and illnesses from labor and delivery complications. By some estimates, better care during labor and delivery could prevent 50 to 80 percent of maternal deaths (91, 204, 237, 250, 322, 388). Even in a developed country, care makes a great difference. For example, in a US religious group that refuses prenatal and delivery care, the maternal mortality rate in 1975–82 was over 800 per 100,000 live births—a rate higher than in many developing countries (187).

Improving delivery care in the community is crucial because most births take place at home. Most countries do not have enough clinics and hospitals for every delivery, nor can they afford to build, staff, and equip enough facilities in the near future. Also, for various reasons many women prefer giving birth at home in familiar surroundings. Others prefer giving birth at home so that they can observe ritual ceremonies. Still others prefer home births because they fear hospitals.

Most births are attended by traditional practitioners. Traditional birth attendants (TBAs) or family members attend as many as 70 percent of the world's births (222, 350). Cooperation between traditional practitioners and the modern health care system thus is vital.

Organizing Community Care

Where most births take place at home, efforts to improve delivery care have usually involved:

- Organizing and training practitioners who work in the community and attend most births, and
- Organizing a system to get women with unanticipated complications to facilities that provide emergency care.

In the community, delivery care can be organized in various ways, depending on what resources and personnel are available and how personnel are trained. Whether TBAs can be

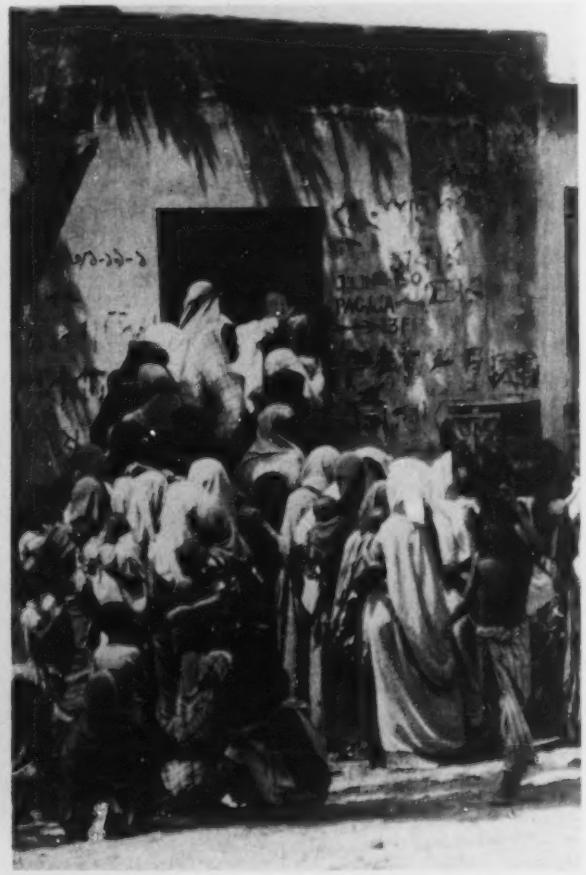
(Continued on page 18)

Modern Maternal Health Care:

Many women around the world do not get modern prenatal, delivery, or postpartum care. Most of those who do get prenatal care see a health care provider only once, late in pregnancy (397). Less than half of the world's women give birth attended by trained health care providers (407). Even fewer women get modern care after delivery.

Prenatal Care

Women who would benefit most from prenatal care—the undereducated and the poor—get it least (16, 74, 80, 101, 257, 260, 269, 289, 290, 342). For instance, in a 1981 Mexican study the poorest, least educated women—those with less than four years of school who lived in houses with mud floors—



One reason some women do not get modern maternal health care is because it takes too long. Clinics are often too far away or too crowded. (World Bank)

were only one-quarter as likely to have prenatal care as women with more education and better homes (302). Also, rural women are less likely to receive prenatal care than urban women (see Table 3), even though preventive care is most vital for those furthest from emergency care.

Women often do not get prenatal care because it costs too much in time and money. Prenatal visits often take several hours. In a village in West Bengal, India, for example, 81 percent of the 114 pregnant women interviewed knew that prenatal care is important, but 42 percent did not use prenatal services—mainly because it took too much time (312). Women may not attend prenatal clinics because they cannot afford to pay for transportation or, in some places, services. In Nigeria, for example, attendance at government prenatal clinics began dropping in 1985 when clinics started asking for large deposits for prenatal care (20).

As with other health care, prenatal care is sometimes too far away. A 1979 survey of 1,765 women in Jordan, for example, found that the distance to clinics and the time and cost of traveling largely determined whether women used them (1). And in Cebu, Philippines, researchers found that rural women made more prenatal visits when clinics were within walking distance (402). As a rule, women are much more likely to use prenatal services when they are within three kilometers (397). Especially in rural areas, however, there are often no services that near (176, 222).

In some places the clinic atmosphere keeps women away. For example, women often prefer female health care providers, particularly in Muslim and Hindu societies (222, 265, 397). Yet in many places all the trained health care providers are men. Also, prenatal clinics often do not offer adequate privacy when examining women (131, 222), or health care providers do vaginal examinations at every visit. Often providers do not treat women with respect or give them enough time and attention. Many clinics run out of supplies or have broken equipment and therefore turn women away. Also, women may think of hospitals as places to die and consequently avoid clinics held in hospitals. Generally, women with traditional lifestyles and those who delivered their first babies at home are not likely to use prenatal services (241, 382, 402).

Since pregnancy and childbirth are natural events, it is often difficult to convince people that prenatal care is important. Many women see no need for prenatal care unless they have complications (27, 222, 265, 302).

Programs can solve many of these problems by improving the quality of services, by bringing services closer to women—even to their homes, by making them less intimidating, by educating families and communities about prenatal care, and by integrating modern prenatal care with traditional care.

Care During Delivery

In 1985 the World Health Organization estimated that nurses, midwives, or trained TBAs attended 34 percent of births in Africa and Oceania, 49 percent in Asia, and 64 percent in Latin America and the Caribbean (407). According to 1986-87 Demographic and Health Surveys in four African and two Latin American countries, doctors or midwives attended 20 to 60 percent of births in the preceding five years (74, 101, 260, 269, 289, 290, 342). In many cases these numbers are low because trained personnel are not available. Even when they are, however, some women, even if they develop complications during labor and delivery, are reluctant to use health centers or hospitals (204, 338).

Why do some women avoid delivering in modern facilities with modern practitioners? The same problems that afflict prenatal care also afflict delivery care (20, 26, 212, 222, 341). Also, staff may not be at the facility. In addition, whereas prena-

Table 3. Percentage of Women Reporting at Least One Prenatal Visit During Most Recent Pregnancy, by Place of Residence, Demographic and Health Surveys, 1986–1987[a]

Country & Year	Urban	Rural	Total
Sri Lanka 1987	97	97	97
Dominican Republic 1986	NA	NA	95
Liberia 1986	91	77	83
Burundi 1987	96	78	79
Thailand 1987	94	74	77
Brazil 1986	86	51	74
Ecuador 1987	82	58	70
Colombia 1986	83	59	69
Senegal 1986	95	46	63
Guatemala 1987[b]	56	26	34
Morocco 1987	48	13	25

[a]Interviewers asked women: "When you were last pregnant, did you see anyone for a check on that pregnancy?" Data cover only pregnancies that took place within five years preceding the survey and only those checked by a trained health care provider.
[b]Checked by a doctor or nurse.

Sources: Demographic and Health Surveys (74, 80, 92, 101, 260, 269, 342, 434).

tal care is often free, delivery services often are not. In Addis Ababa, Ethiopia, for example, where the average annual per capita income is $141 (US), hospital deliveries require a down payment of $50 (201).

Some women do not use modern delivery services because they see maternity wards as places to die. In fact, complicated cases are usually referred to hospitals or health centers—often too late—and many women do die there. Some die, however, at least partly because facilities are overcrowded, understaffed, poorly equipped, and inadequately supplied (175, 204, 237, 338) or because the care is inadequate or even incompetent (73, 204, 250, 280, 418). In some African cultures women want to avoid cesarean section at any cost. Women who have had cesarean sections or fear that they might be told to do so often avoid prenatal care and hospital delivery (89). In some cultures married women need permission from their husbands, mothers-in-law, or other relatives to leave the house, to use health services, and especially to go to a hospital or waiting home. If relatives and husbands are reluctant to accompany women or are absent when women need emergency care, women may not be able to use available services.

An obvious way to encourage the use of modern care is to improve services. Also, if at all possible, facilities need to provide free delivery care for the poor. At the same time, programs also need to convince community leaders and influential family members that their services are important. Community leaders who support modern health services can convince husbands and relatives that care is vital.

Postpartum Care

Even fewer women receive postpartum care than prenatal or delivery care. For example, in 1982 only about 5 percent of new mothers in Costa Rica made at least one postpartum visit even though 97 percent delivered in health care facilities. Even in Jamaica, where mobile clinics offer free postpartum care, only 37 percent of new mothers in 1981 received any postpartum care (407). In Ecuador 29 percent of pregnant women in 1977 received prenatal care, and 17 percent of deliveries were attended by a physician, but only 4.5 percent of women who gave birth received postpartum care (331).

Often women do not attend postpartum clinics for cultural reasons. In places as diverse as Viet Nam, Guatemala, and Nigeria, the first weeks or months after delivery are a time of rest, and new mothers are expected to stay home (26, 81, 103, 136). In such places health care providers should visit new mothers at home.

More women will get good maternal health care if care comes to them. Here, a health care provider in Somalia examines a pregnant woman in her home. (Tantlu, US AID)

trained to attend home deliveries safely is controversial. Because TBAs are so widely available, however, and acceptable in the community, many programs train TBAs (see pp. 22–25).

Trained TBAs and more extensively trained personnel work together in many communities. In Sierra Leone, parts of India, and elsewhere trained TBAs assist normal births and refer women with complications to assistant nurse-midwives (159, 192). In Malaysia trained TBAs and government midwives attend normal births together. The midwife assists the birth, and the TBA disposes of the placenta according to custom. They refer women with complications to the regional hospital (206, 337).

In other places there are no assistant nurse-midwives, and trained TBAs or village midwives assist almost every birth, sending complicated cases directly to referral centers. For example, around Fortaleza, Brazil, TBAs assist some births in women's homes, others in village obstetric units. Each unit has an ambulance so that women with complications can be moved quickly to the hospital (13, 175). In Sudan village midwives with six months of training assist most births. If complications develop, they send for help from midwives and doctors at the nearest health center (33).

Some places have replaced TBAs with professional personnel. In many European countries, Costa Rica, Cuba, and elsewhere, women deliver in health centers or at home assisted by assistant nurse-midwives or midwives (339, 375). Complicated cases deliver in well-equipped centers assisted by doctors.

WHO/World Bank Strategy to Prevent Maternal Deaths

Action in the community is one part of a larger strategy to prevent maternal deaths. The World Health Organization (WHO) and the World Bank, following the approach endorsed by the 1987 International Safe Motherhood Conference in Nairobi (355), are focusing their attention on low-cost ways to prevent the five major causes of maternal death—obstructed labor, hemorrhage, toxemia, infection, and complications of abortion. Along with community-level activities, WHO and the World Bank are particularly concerned with upgrading district hospitals and rural maternity centers so that they can deal with obstetric emergencies, with training more midwives, and with improving communication and transportation between rural communities and district hospitals.

For more on the WHO and World Bank strategy, see:

Starrs, A. *Preventing the tragedy of maternal deaths.* (355)

Herz, B. and Measham, A.R. *The Safe Motherhood Initiative: Proposals for action.* (159)

World Health Organization. *Helping women off the road to death.* (418)

Managing Normal Labor and Delivery

Usually women give birth without serious problems. Regardless of who assists them, delivery care for these women involves:

- Providing a clean environment and instruments and carefully washing hands and fingernails before assisting the woman.
- Avoiding harmful practices such as pulling on the umbilical cord to deliver the placenta, performing vaginal examinations with dirty hands, or cutting the umbilical cord with a dirty implement.
- Helping the woman feel as comfortable as possible.
- Physically assisting the woman during birth—for example, positioning her to make pushing easier, slowly easing the infant's head out of the vaginal opening, and checking the placenta after delivery to make sure that it is complete.
- Having women breastfeed immediately after delivery (10, 277, 291).

Managing High-Risk Labor and Delivery

Women at high risk of complications can deliver in community maternity centers if necessary, although delivery in a well-equipped hospital would be safer. If these women have problems, assistant nurse-midwives or midwives who staff maternity centers can monitor them closely. These practitioners can arrange transportation quickly, stabilize women before transporting them, and possibly talk by radio or telephone with medical staff at the referral center.

Labor and delivery records are useful tools for literate birth attendants assisting high-risk births. Usually a single page, the record graphically depicts such information as the rate of cervical dilation, the strength of contractions, the fetal heart rate; and the mother's pulse, blood pressure, and temperature. Record forms remind attendants to monitor these signs and help them to see abnormal trends. They also help attendants in community centers recognize when labor is abnormally prolonged and referral is needed. Such records also are an easy way to communicate vital information to referral centers (47, 58, 82, 110, 294, 358, 419, 420).

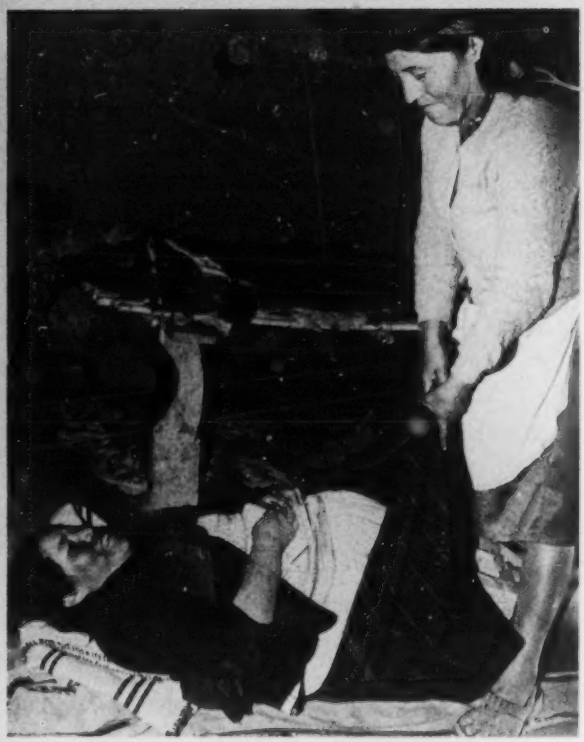
When women are transferred to referral centers, community practitioners should send the women's prenatal care cards along with their labor and delivery records (65, 109, 189, 272). Hospital staff, in turn, should send follow-up reports to community practitioners, telling them what they did for the patient, how she is doing, and whether the referral was in time.

Handling Emergencies

As many as 10 percent of women whose pregnancies appeared normal develop serious complications during labor and delivery (235, 261). If these women are delivering at home, they need to be moved quickly to a health care facility that can manage their complications. Therefore community birth attendants and community members should recognize signs of the most common complications (see box, p. 12) and know what to do when they occur.

Simple protocols help community providers handle the most common life-threatening complications—hemorrhage, prolonged labor, and eclampsia. Protocols should cover: (1) how to care for the woman immediately and (2) how to get transportation and make the referral to a midwife or doctor.

For example, protocols for treating hemorrhage may include performing gentle bimanual uterine massage, giving an oral



Traditional birth attendants or family assist 70 percent of all births. Here, a Bolivian *partera empírica* shakes her client in a blanket—a traditional practice intended to put the fetus in the right position. (Cerni, UNICEF)

dose or injection of ergometrine, or manually removing a retained placenta. Because breastfeeding brings on uterine contractions that prevent hemorrhage in some cases, attendants should encourage women to breastfeed immediately after delivery. If none of these measures prevents or stops hemorrhage, attendants may begin replacing blood volume with intravenous plasma expanders before transporting the woman to a hospital (111, 215, 399). If there is no transportation, these measures may be the only hope of saving a woman's life.

Whether trained TBAs or assistant nurse-midwives should provide such medicines and treatments is controversial. Only a few programs allow community-level practitioners so much responsibility. For example, village midwives in Sudan and trained TBAs in Sierra Leone administer oral ergometrine when a woman hemorrhages (4, 141). In Tanzania and Malawi medical assistants perform vacuum extractions and cesarean sections (35, 200). No programs have formally evaluated how safely and effectively trained TBAs and paramedical personnel can perform these procedures.

How should programs decide what treatments community-level attendants should provide? This decision rests on answers to several questions:

- How rapidly and dependably can a woman get to a referral center?
- What medical supplies and facilities can be made available to the community?
- What kind of training and supervision can the program provide for community-level attendants?
- Will this training give attendants enough expertise to decide correctly when to treat and when to refer?

With TBAs, the decision may also depend on what treatments the community expects them to perform. Many traditional communities have complex networks of traditional practitioners who specialize in different tasks such as setting bones or giving injections. According to local tradition, specialists other than TBAs may have to give injections or remove retained placentas (267, 287).

Organizing Transportation and Communication

There will always be some women whose lives depend on quick transportation to a hospital. The lack of quick, reliable communication and transportation often impedes emergency obstetric care. For example, Sierra Leone has three provincial referral centers and several rural maternity centers. Most deliveries are attended by TBAs trained to refer to these centers. Referrals are rare, however, because 80 percent of the population lives in small villages with no roads (4).

When possible, community-level providers can arrange with community leaders to have local vehicles available for emergency transportation. Sometimes they can make arrangements to use vehicles, telephones, or shortwave radios owned by other agencies working in the community.

Several programs have devised innovative solutions to transportation and communication problems. For example, in a community in rural Somalia birth attendants raised a flag beside the road when a woman needed transportation to the referral hospital. Community members with cars or trucks, alerted by the flag, drove women to the hospital (323). In Malawi, British Aid developed an ambulance attachment for a bicycle that holds a detachable stretcher (119). In Sudan messengers carried special colored coins when they went for help. A green coin indicated prolonged labor; a red coin, hemorrhage; and a white coin, doubtful diagnosis (33, 141).

Where possible, referral centers should have an ambulance or an emergency obstetric squad to bring emergency care to women. For example, in 1974 the Katsina Maternity Hospital in northwest Nigeria established an emergency obstetric squad equipped with an ambulance. An evaluation after nine months found that only 5 percent of the women who used the emergency squad had died compared with 19 percent of the women who delivered in the hospital but did not use the squad (336).

When prenatal screening identifies a woman likely to develop complications during labor, arranging transportation in advance can help her get to the hospital before labor begins. For example, in Côte d'Ivoire government midwives give high-risk women gasoline vouchers (192). In Zambia women referred to hospitals have been given tickets for free bus transportation (119).

Research Questions

- *How can modern and traditional practitioners best work together to improve delivery care?*
- *How fast a response is needed to various complications? How should services be organized to provide appropriate care in time?*
- *What aspects of modern delivery care make some women avoid it? How can services be improved to attract more clients?*
- *In what situations can briefly trained community health workers give injections, provide other medications, or even give transfusions?*

CARING FOR WOMEN IN REFERRAL CENTERS

Maternity care in the community is essential, but women at high risk of obstetric complications or with unexpected problems need more care than the community can provide. Thus referral centers are needed, linked to the community by transportation and communication. By providing each woman with the level of care she needs, a referral network uses its resources to serve the most women (see Figure 3).

A referral network has four essential components:

(1) Community-level care that includes prenatal screening and monitoring for complications, delivery care for normal births, and postpartum care for all women (see pp. 12–19);

(2) Referral centers—clinics or hospitals—with staff trained and equipped to manage complications of pregnancy, labor, delivery, and the postpartum period;

(3) A central hospital equipped and staffed to manage serious, rare complications of pregnancy, labor, delivery, and the postpartum period. The central hospital also should train doctors, nurses, midwives, and auxiliary personnel; and

(4) Quick and reliable transportation and communication between communities and referral centers and between referral centers and the central hospital.

Referral Centers

Referral centers are usually centrally located rural or district clinics or hospitals. They are often established by setting up obstetric units and training staff in existing hospitals. In addition to routine maternity care, referral centers provide life-saving medical and surgical care. The World Health Organization (WHO) has identified eight services that referral centers should provide (355, 409, 421). Community maternity centers may also be able to provide some of these services. Program planners need to decide which to provide in community clinics, if they exist, and which to provide only at referral centers (see pp. 18–19). These eight services are:

(1) **Surgical procedures**—cesarean sections, draining pelvic and abdominal abscesses, repairing high vaginal and cervical tears, removing ectopic pregnancies, emptying the uterus following incomplete abortion, symphysiotomies, and, in cases of severe complications, rupturing the amniotic membrane to induce or quicken labor.

(2) **Anesthesia**—general, spinal, and local.

(3) **Medical treatments**—giving fluids and medications intravenously; treating shock, infection, preeclampsia, and eclamptic seizures; and inducing labor.

(4) **Blood replacement**—transfusing blood or administering other intravenous fluids for hemorrhage or surgery.

(5) **Manual procedures for diagnosis and treatment**—removing retained placentas manually, delivering by vacuum extraction or forceps, and using partographs (graphic records of cervical dilation) to monitor labor;

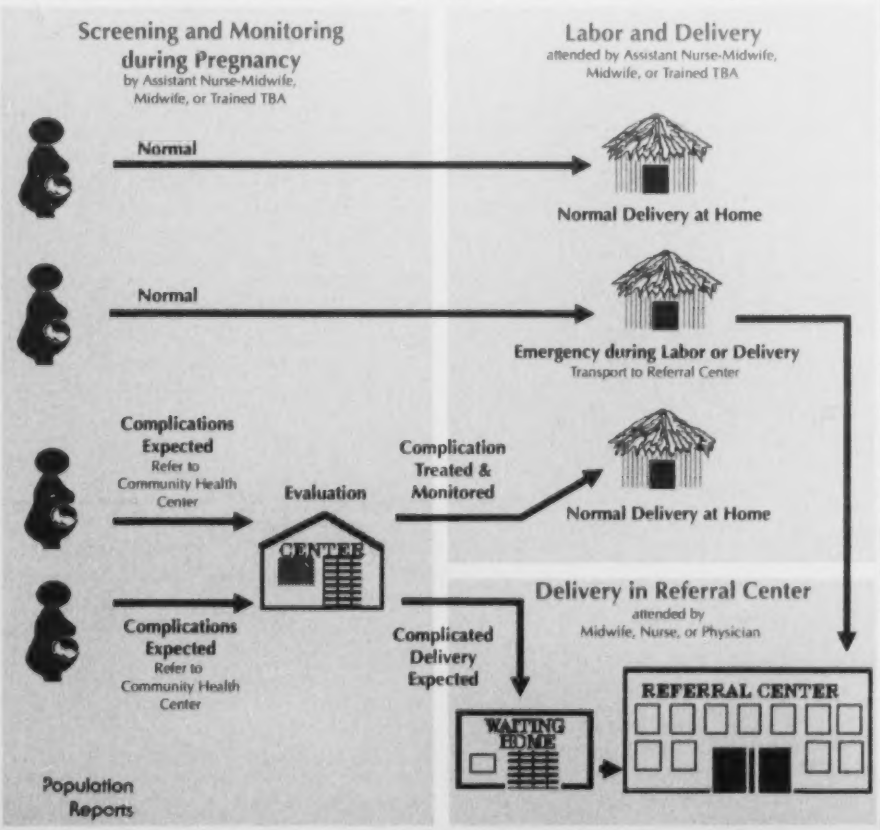
(6) **Family planning**—tubal ligations, vasectomy, intrauterine device (IUD) and Norplant insertion and removal, and other family planning methods.

(7) **Special care for newborn babies**—resuscitation, keeping them warm, preventing low blood sugar, and treating infections.

(8) **Managing high-risk women**—providing waiting homes close to referral centers (see below).

A special room with beds should also be available for women having normal vaginal deliveries (355, 409).

Figure 3. The Referral System: Providing Appropriate Care for All Pregnant Women



Waiting Homes

Waiting homes—houses or dormitories near referral centers—are a way to improve obstetric care where transportation is poor. Women likely to have complications can stay at these homes during the last few weeks of pregnancy. Referral centers sometimes provide fuel and water, while women and their families provide bedding, cooking utensils, and food. Of course, waiting homes can work only where prenatal screening detects high-risk women and

Waiting homes give women likely to have delivery complications a place to stay near a hospital in the final weeks of pregnancy. Here, women rest outside a waiting home in Malawi. (Newton, PATH)

where health care providers can estimate when labor will begin (192, 234, 409, 421).

Hospitals in a number of countries have set up waiting homes. For example, Ituk Mbang Hospital near Uyo, eastern Nigeria, established a waiting home in the early 1960s. This home helped reduce maternal mortality among hospital deliveries from 10 per 1,000 live births to less than one per 1,000 (215). In 1980 Alotau Provincial Hospital in Papua New Guinea established a waiting home open to any woman from a remote village who had had four or more pregnancies. Between 1980 and 1982, 43 percent of the 180 women who stayed in the home had complicated deliveries, but only one woman died. Nine percent required cesarean sections. Many more would have died if they had delivered on their remote islands (29). Waiting homes are probably used most extensively in Cuba. In 1984 there were 85 waiting homes with 1,461 beds (60). Waiting homes also have been established in Brazil, Chile, Colombia, Kenya, Malawi, Uganda, Zaire, and elsewhere (97, 192, 234, 421).

Research Questions

- ***In a specific area, which emergency care procedures can be provided in community centers and which only in referral centers or the central hospital?***
- ***What is the best way to monitor the quality of care provided in referral centers?***
- ***How can referral centers help to see that referrals from the community are appropriate and prompt?***
- ***What are the costs and cost-effectiveness of various components of maternal health care? Particularly, how much does preventive care in the community contribute compared with emergency and high-risk care in the referral center?***
- ***In a specific area, will women use waiting homes? Will communities help to support them? What features of waiting homes can make them attractive to women and their families?***

CARE AFTER DELIVERY

Whether a woman delivers at home or in a referral center, she needs postpartum care at home. Traditional beliefs often require women to stay home during the postpartum period (296). Even where women's activities are not restricted after they give birth, many women want to stay home and care for their babies. More women can get postpartum care if community practitioners care for them in their homes.

Modern care after delivery has four important purposes:

- Early detection and either referral or treatment for maternal infection or hemorrhage,
- Early detection and referral of infants who have infections or other problems,
- Counseling about family planning and provision of family planning methods, and
- Education about nutrition, rest, breastfeeding, and childcare, as well as help with breastfeeding.

The First-Week Visit

Health care providers should visit women during the first week after delivery. Infections of the uterus, breasts, or urinary tract are common after delivery, and this is the best time to detect them. Symptoms of uterine infections often do not develop until 24 hours or more after delivery. At the same time, antibiotics are most effective against uterine infections when taken during the first four days of symptoms (218).

Most programs train community providers to identify and refer women with infections for antibiotics. For example, TBAs in Karawa, Zaire, were taught to refer a woman to the hospital if she had fever, abdominal pain, or foul-smelling vaginal discharge (97). Where referral is not possible, community providers may need to supply broad-spectrum antibiotics. The effectiveness and safety of this have not been well-studied.

The first week after delivery is also a good time to talk with women about family planning, breastfeeding, and nutrition. Counseling and education should cover:

- The benefits to mother and child of spacing births at least two years apart and preventing pregnancies after age 35 or four children.
- The health and contraceptive benefits of breastfeeding, including when a breastfeeding woman needs to start family planning and which methods are best (see **Population Reports**, *Counseling Guide*, J-36, December 1987).
- What family planning methods are available and where, and their advantages and disadvantages. Providers can leave supplies, such as oral contraceptives or condoms, that women can start using at the appropriate time.
- The need for extra food and rest after delivery and especially while breastfeeding.

Some programs give women food during the postpartum period. The extra food can replace nutrients lost during pregnancy and can build up fat reserves for the next pregnancy (59). Supplemental food also can help provide the extra energy that

Health workers should see women in the week after delivery and, if possible, at perhaps six weeks and three months postpartum. These are good times for women to learn about family planning and for infants to be weighed and immunized, as this mobile team does in Malaysia. (J. Abcede, WHO)

breastfeeding women need—an additional 500 kilocalories per day, according to WHO (408). Also, food supplements may increase the birth weight of infants born subsequently by improving the mother's nutritional reserves (381).

Later Visits

Many programs see women again six weeks and three months after delivery. These are times when many women want to start a family planning method and when infants need immunizations (see **Population Reports**, *Immunizing the World's Children*, L-5, March-April 1986). Usually a woman's uterus has returned to normal by the sixth postpartum week. Thus the sixth-week visit is also a time when some nurses, midwives, and doctors examine the uterus and vagina for signs of infection, retained placental fragments, and other problems. Where women feed their babies only breast milk for six months or more, a still later visit may be a better time to offer family planning.

Any health care provider who sees women postpartum can explain and provide family planning. Trained TBAs in numerous countries distribute oral contraceptives, condoms, and spermicides (207, 333, 350, 428, 438, 439). A women should avoid oral contraceptives during the first six weeks of breastfeeding. If she wants to use a pill after that, progestin-only minipills are best. Nurses and paramedical personnel in countries such as Bangladesh, Pakistan, the Philippines, South Korea, Sri Lanka, Thailand, and Turkey safely insert IUDs (129, 293).

Modern techniques and ideas must be integrated with traditional beliefs and practices. In many places traditional practitioners or relatives provide postpartum care, and there are often many cultural prescriptions and proscriptions that postpartum women must follow. Beneficial practices should be encouraged; harmful practices, discouraged; and practices that are neither beneficial nor harmful should be taken into account in planning care. For example, in many traditional ethnic Chinese societies women do not leave their homes, bathe, or let a man enter their room during the first month after giving birth (297). In such cultures only female health care providers can visit postpartum women.

The impact of postpartum care is difficult to evaluate. First, no maternal health program would want to operate without offering postpartum care. Second, the emphasis of postpartum programs may differ. A program that focuses on family planning may be evaluated differently from one that emphasizes breastfeeding. Partly because of the lack of research, there are no universal standards for the number and timing of postpartum visits, who should provide postpartum care, or exactly what should be done during postpartum visits.

Research Questions

- *Why do so few women receive postpartum care?*
- *How well does postpartum care prevent postpartum infections? What aspects of postpartum care are most important to prevent infections?*
- *Can community-level providers encourage continued breastfeeding and family planning during postpartum visits? What is the best schedule for such visits?*

TRAINING FOR BETTER MATERNAL HEALTH CARE

Whether they are midwives, nurses, assistant nurse-midwives, or traditional birth attendants (TBAs), community-level providers need training. Community workers need training to care for women safely before, during, and after delivery. Many programs worldwide show that training can help TBAs provide safer delivery care. At the same time, midwives, nurses, and sometimes assistant nurse-midwives need training to supervise community-level workers and to handle complicated pregnancy, labor, and delivery.

Training Traditional Birth Attendants

Training TBAs in modern health care may be the quickest way to improve obstetric care, especially for rural women. In many places there are many more TBAs than doctors or midwives, making TBAs the most accessible providers of maternal health care. Even where trained midwives or doctors are available, women often prefer TBAs (165, 219, 267, 350). As well as being familiar peoples who may perform riturals surrounding childbirth, TBAs are often less expensive than modern practitioners and may accept payment in kind (206, 296, 350, 369).

Some medical personnel are skeptical about training TBAs (210). They contend that TBAs can be effective only when trained for a specific skill or when their function is largely limited to referral. They also note that nonliterate TBAs cannot collect data needed to run a maternal health program. And they point to the scarcity of evaluations looking at TBA performance in terms of maternal health.

For the most part, however, health care systems are moving to involve TBAs in modern maternal health care. Many governments, international agencies, and private institutions train TBAs (see **Population Reports**, *Traditional Midwives and Family Planning*, J-22, May 1980). Some see this as a temporary measure necessary only until more nurses, midwives, doctors, and hospitals are available. Others see it as a permanent component of maternal health care. Training usually lasts anywhere from several days to three months. In general, shorter courses held in the community are now replacing longer courses at regional centers. Usually, assistant nurse-midwives, nurses, or midwives are the trainers (10, 96, 229).

Most of these training programs teach TBAs:

- To provide or refer women for prenatal care,
- To recognize and refer women early for complications during labor,
- To practice good hygiene during delivery, including proper care of the umbilical cord, and
- To recognize and refer women with abnormalities in the days following delivery.

Some programs also train TBAs to offer family planning (102, 165, 229, 350, 376, 410). Also, where AIDS has been found, TBAs and all others who attend births need to know how to protect themselves and their clients from human immunodeficiency virus (HIV), which causes AIDS. Training should stress the importance of wearing clean gloves during deliveries. If gloves are not available, birth attendants should carefully wash their hands after deliveries. If they have open sores on their hands, they should not attend deliveries. Trainees also should learn to sterilize or dispose of instruments after each delivery.

Evaluations of TBA Training

Most evaluations of TBA training have focused on TBAs' performance. A few have looked at perinatal deaths (165, 219). None has focused on the effects of training on mothers' health. None has evaluated the effects of varying duration, content, or style of training or the type of supervision that TBAs receive after training.

Most evaluations of TBA performance show improvements with training. According to interviews with TBAs and their clients, trained TBAs are more likely than untrained TBAs to refer women for prenatal care, to wash their hands before delivery, to use a sterile instrument to cut the umbilical cord, and to refer women who develop complications to more highly trained medical personnel (34, 42, 48, 86, 166, 198, 211, 229, 306, 309, 319, 359, 369, 396).

People learn best in small groups using a variety of participatory training methods such as role-playing, demonstrations, discussions, and practice. Here, traditional birth attendants play roles in a delivery during training in Nigeria. (American College of Nurse-Midwives)

Not all training programs have changed TBAs' behavior, however (9, 42, 78, 211). Recent evaluations of TBA training in Liberia and southern India, for example, found that trained TBAs were no more likely than untrained TBAs to refer complicated cases (211). In one of the few evaluations in which investigators actually observed TBAs attending deliveries, some trained TBAs in Bangladesh made potentially harmful mistakes. Some cut the umbilical cord too short, placed their bare feet against the woman's perineum, repeatedly examined the vagina with unwashed hands, or failed to put antiseptic on the umbilical cord (78).

Evaluations looking at changes in perinatal mortality and especially at deaths from neonatal tetanus show mixed results. Generally, deaths from neonatal tetanus decrease after TBA training (40, 113, 165, 211, 219, 229, 308, 325). Most programs that train TBAs also offer tetanus toxoid, however, and the effects of the two cannot be separated (325). Also, few studies of neonatal tetanus deaths have compared areas with trained TBAs and areas with untrained TBAs.

A 1982 study in Bangladesh did separate TBA training and tetanus immunization. As expected, immunized newborns were the least likely to die from tetanus. Neonates delivered by trained TBAs, however, had the lowest mortality from all other major causes and the lowest death rate overall (308). Although many of the details are lacking, this study suggests that training TBAs can substantially reduce neonatal mortality (325).

Improving TBA Training

What can be done to improve the performance of trained TBAs? The most successful training programs:

(1) Ask community members to help select TBAs for training,
(2) Use training methods that allow trainers to learn from TBAs as TBAs learn from trainers,
(3) Carefully supervise TBAs after training, and
(4) Provide locally available supplies to make deliveries cleaner and safer.

Community involvement. TBAs can introduce new practices more easily if their communities have endorsed and encouraged their training. One way that communities become involved is by selecting TBAs for training, as they have in Afghanistan, Bangladesh, Sierra Leone, Tanzania, and elsewhere (10, 78, 229, 410).

Before planning a training program, planners need to find out who local TBAs are—their sex, age, extent of literacy, social status, and the number of deliveries they assist each year. From country to country and even within communities, there is extraordinary variety in these matters. For example, in some places a few TBAs assist most deliveries. These TBAs are obvious candidates for training. Where, by custom, women's relatives usually attend births, no one person attends many births, and training a few TBAs may not make much difference. There are also communities that have no TBAs (350).

Where TBA training is appropriate, programs should train TBAs in responsibilities compatible with custom. For example, in one region of Haiti people believe that, if a TBA visits a preg-

nant woman before labor, the baby may be malformed or the woman may have a difficult labor. Consequently, a training program for TBAs in this region did not cover prenatal care (40).

Serious misunderstandings can arise when communities are not consulted and involved. For example, in Peru hospital personnel rather than community leaders often selected TBAs for training. Consequently, several trained TBAs were not allowed to practice in their communities (86). In Sirur, India, and in parts of Ghana and Zambia, families mistakenly thought that the government paid the trained TBAs and so stopped paying them for their services (303, 368). Winning the support of the community also helps to win over the TBAs, who might otherwise consider referral networks and modern practices to be in competition with their services.

Training methods. Training TBAs, who are mostly nonliterate and elderly, requires special skill. Lectures are usually not effective. Rather, TBAs, like most adults, learn best in small groups using a variety of participatory training methods such as role-playing, demonstrations, discussions, and practice (10, 102, 165, 181, 219, 288, 376). Because TBAs are often old, trainers may need to adjust their teaching for those who cannot see or hear well. Also, visual aids must be carefully pretested. The Pachod project in Maharastra, India, for example, uses pictures drawn by TBAs themselves because their peers understand such pictures better than those drawn by trainers (309). Like anyone else, if TBAs are looked down upon or treated with disrespect, they are less likely to learn and to cooperate later.

Training programs should build on TBAs' knowledge. In many cases TBAs already are providing good care. For example, among 3,860 home deliveries in Addis Ababa in 1983, the maternal mortality ratio for women delivered by mostly untrained TBAs was one-third the ratio for women delivered by friends or relatives (201). Training, therefore, should be interactive, allowing TBAs to discuss problems that they have encountered and solutions. One purpose of training should be for TBAs to exchange knowledge among themselves and with the trainers (181).

Unfortunately, trainers rarely receive special preparation to teach TBAs. Usually midwives and nurses act as trainers after only one day or less of orientation. These trainers rarely receive any supervision. Consequently, they often revert to teaching TBAs in the same way that they were trained themselves—with lectures (165). Also, trainers often do not understand traditional medical beliefs. As a result, their lessons may seem irrelevant to the TBAs (181). Midwives and auxiliary nurse-midwives often have less experience delivering babies than the TBAs whom they train. It is no wonder that TBAs may not trust what their trainers say. One possible solution is to train TBAs as trainers of other TBAs.

The program to train village midwives in Sudan is an example of innovative training methods. The program began in 1921 by training traditional midwives. Now, however, the program trains young village women, most of whom are nonliterate, to become midwives in their own villages. At several rural training centers, trainers, many of whom were village midwives themselves, teach the students to recognize medicines by taste, smell, and appearance. Trainees often memorize risk factors and treatment protocols by means of songs or rhymes. They practice deliveries on mannequins (33, 140, 365).

Supervision. Once trained, TBAs need encouragement and support from other health care providers to continue practicing what they have learned. They need to know what they are doing well and how they can improve. They need periodic refresher training. Also, they need contact with and respect from other health care providers so they feel that they are an important part of the maternal health care system. Supervision is difficult, because travel and communication can be arduous and because programs usually do not pay the TBAs they have trained. Training that leads to government certification, as in Egypt, can help incorporate trained TBAs into the modern health care system (369, 372).

Programs in India, Syria, Zimbabwe, and elsewhere supervise TBAs by asking them to make regular visits to the nearest health center. There they discuss problems, obtain more supplies, and report births and deaths (102, 165, 309).

This type of supervision does not always succeed. In Bangladesh, for example, even though trainees were offered payment for visiting health centers every month, not one TBA showed up during the first year. The reasons for this are not known (165).

In some places supervisors regularly visit trained TBAs. In parts of the Philippines, for example, supervisors have accompanied TBAs on home visits and held monthly group meetings with them (239). In Al Jabin, Yemen Arab Republic, one trained TBA became the others' supervisor, making regular visits to their villages, resupplying them, and handling emergencies (262).

This type of supervision has its weak points, too. Supervisors who visit TBAs need training, supervision, and support. Travel to remote areas where TBAs work takes time and money. When programs add this kind of supervision to assistant nurse-midwives' other tasks or fail to pay for travel expenses, supervision may break down. For example, in a Nicaraguan program in the late 1970s, supervisors were supposed to visit TBAs regularly. The Ministry of Health did not pay for travel, however, so supervisors did not visit the TBAs (156).

Delivery kits. Almost all training programs give TBAs delivery kits when they graduate. These kits contain items that help make deliveries cleaner and safer. They range from simple kits that consist of clean razor blades, dressings, and antiseptic for clean cord care to elaborate kits that include medicine and equipment for complicated deliveries. Some programs also include in the kits family planning supplies, iron tablets, malaria medication, oral rehydration salts, and other medications. Programs often give TBAs delivery kits to signify that they have completed training.

The United Nations Children's Fund (UNICEF) produces kits that have been widely distributed. They contain up to 26 items including scissors, dressing packs, metal basins, and towels. Programs may request the combination of equipment best suited to their needs (96, 165, 273, 409, 410).

Unfortunately, TBAs often do not use their delivery kits. In Pakistan a study found that 31 percent of trained TBAs never carried their kits, and 21 percent carried them only some of the time (306). Similar reports come from India, Ghana, and Haiti (40, 42, 57, 165). TBAs may not use their kits because they do not know what to do with all the items, because supplies run out, or because they consider them symbols of their training, like diplomas, and thus more appropriately displayed than used.

There are several solutions to these problems. Training courses should teach TBAs how to use everything in the kit (57, 273, 425). Also, if kits are made from local products, TBAs can restock them more easily. In Manicaland, Zimbabwe, for example, clinics and hospitals make up packs of sterile razor blades, cord ties, cotton wool, and a bottle of alcohol. Health care providers give these packs to women during their prenatal visits. TBAs may be more likely to use the kits when clients provide them (102). In Nepal during prenatal visits trained TBAs told families that part of the price for delivery care was a new razor blade. The TBA uses the clean razor blade to cut the cord and then buries it along with the placenta after the birth (323). In Bangladesh starting in 1983, women and health workers could buy delivery kits for a low price at pharmacies and other stores. Over 30,000 kits were sold. Initially the kits were too expensive for many women and health workers because their production was not subsidized. Later there were problems with manufacture. For these reasons the Bangladesh Social Marketing Program decided to discontinue sales in 1987 (100).

In response to problems with prepared delivery kits, the World Health Organization (WHO) has written guidelines for preparing them in the community. They suggest that TBAs have at least: (1) soap and sticks to clean their fingernails and hands; (2) a sterile razor blade, cotton balls, and cotton tape to cut, clean, and tie the umbilical cord; (3) a sheet, towel, or cloth for a clean delivery surface; and (4) another cloth, towel, or blanket to dry and wrap the baby. Of course, TBAs should learn during training how to sterilize the razor blade or other cutting instrument or, preferably, have enough blades that they can throw the blade away after one use (425).

Training Midwives, Nurses, Auxiliaries, and Doctors

There is a pressing need to improve training for physicians, midwives, and nurses. In various developing-country studies as many as half of all maternal deaths have been attributed to incorrect or inadequate actions by medical personnel, in some cases because adequate equipment or supplies were lacking (73, 204, 250, 280, 418).

Furthermore, formal training for midwives, nurses, auxiliaries, and doctors usually focuses on modern hospital care. Only a few programs prepare them to provide maternal health care in rural communities.

The problem of inadequate training is magnified by a shortage of doctors, midwives, and nurses and a lack of supplies and equipment. For example, in 1981 sub-Saharan Africa had only one doctor for every 27,000 people and one nurse or nursing assistant for every 2,500 people (404). Furthermore, although most people in developing countries live in rural areas, most doctors and nurses live and work in cities. Even where doctors, nurses, and midwives are available, lack of clean gloves, antiseptic solutions, appropriate drugs, and clean linen often leads to poor care (204, 237).

Training for nurses and midwives. Some nursing and midwifery schools are rewriting their obstetrics curricula to give community-level obstetric care more attention. In the Philippines, for instance, the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO), in cooperation with the Ministry of Health, offers training for nursing faculty in obstetric care for rural settings. Faculty are now reviewing and rewriting nursing curricula. One goal is to give nursing students more community obstetric experience (6).

Formal training for midwives and nurses has often concentrated on hospital care. Now programs in some countries are training nurses and midwives for maternal health care in community health centers, too. (US AID)

There is disagreement over what procedures nurses and midwives should perform. Recognizing that nurses and midwives in rural centers often work without direct supervision or contact with doctors, some argue that nurses and midwives should be trained to prescribe antibiotics, start intravenous infusions and transfusions, remove retained placentas, perform vacuum extractions, and administer intravenous medications, including valium and ergometrine. Others argue that only doctors have the knowledge and understanding to perform such procedures safely (427).

Nursing schools in some countries are already rewriting their curricula to cover tasks previously done only by doctors. In Africa the International Council of Nurses is coordinating a 3-year series of workshops for nursing associations from 10 countries to exchange information and help redefine the skills that nurses in Africa need (61).

Programs in Cameroon, Malawi, Nigeria, Tanzania, Zaire, and elsewhere train midwives and nurses to perform some obstetric procedures previously done only by doctors. Nurses and midwives in rural maternity centers in these countries sometimes learn to deliver breech and multiple pregnancies, to treat postpartum hemorrhage, and to perform vacuum extractions, cesarean sections, and symphysiotomies (97, 202, 395).

Writing new professional codes of practice for nurses and midwives may be the first step to improving training for community posts. In Malawi the government wrote laws regulating the practice of midwifery so that midwives can legally perform vacuum extractions, blood transfusions, and manual removal of retained placentas. Now their training, set up with the help of WHO, covers these skills (200).

Training auxiliary health care providers. Since the 1960s national maternal and child health programs in several countries, including Afghanistan, India, Nepal, Peru, and Sierra Leone, have trained assistant nurse-midwives to work in rural communities. Training usually lasts 6 to 18 months and concentrates on technical skills rather than theory. Graduates are expected to provide prenatal and postpartum care in rural areas

Research Questions

- ***How effective is training for community health care providers, including TBAs, in preventing maternal illness and deaths?***
- ***What kind and how much supervision is needed after training to ensure that personnel at all levels meet standards and maintain their skills?***
- ***What kind of refresher courses are needed? How often?***
- ***What training methods are most effective for teaching TBAs and other community health workers?***
- ***What local traditional practices are helpful to maternal and child health? How can these practices be incorporated into training?***

and to assist deliveries. Sometimes they also supervise and train TBAs (114, 182, 220, 278, 344).

Although none of these training programs has been formally evaluated, some problems have been noted. A common problem is that these programs often recruit young, single women and expect them to work far from home. In many countries it is culturally unacceptable for young, single women to travel and live alone in distant villages (182). Also, in Sierra Leone, for example, older, experienced TBAs seldom asked the younger, less experienced auxiliary nurse-midwives for help with complicated cases (396). The training program for village midwives in Sudan, however, has been very successful. Although it trains young women without previous experience, the women come from the communities that they will serve (33, 141). In much of the country they have taken the place of older TBAs.

Some programs train auxiliary health care providers in obstetric procedures usually performed only by midwives or physicians. For example, in Tanzania and Malawi medical assistants with four years of training perform certain obstetric procedures including cesarean sections (35). In Papua New Guinea the Ministry of Health and JHPIEGO are developing a long-distance learning program for Health Extension Officers. As part of a course on reproductive health and family planning, these auxiliary health care providers will learn how to treat complicated pregnancies through courses broadcast on shortwave radio. Also, the Ministry of Health has developed a handbook of obstetric protocols for Health Extension Officers (6, 253).

Training physicians. Developing countries urgently need physicians trained as educators, managers, and clinicians to work in district hospitals (409). Medical schools often do not train physicians in preventive care such as routine prenatal screening. Thus they are not prepared to supervise other staff. Also, few medical schools teach general practitioners how to perform common surgical procedures including cesarean section. As a result, most doctors in rural hospitals learn these procedures on the job.

Now a few programs are helping medical schools in developing countries improve training in community obstetrics. For example, the World Health Organization (WHO) Program on Clinical Technology is encouraging medical schools in countries with no specialist training to give more emphasis to practical surgical training. The program has identified surgical and anesthetic procedures necessary and feasible at most district hospitals. Obstetric surgery such as cesarean section is one of the areas covered (391). In Ghana two medical schools are planning to rewrite their curricula for postgraduate obstetrics. The new curricula will cover managerial skills and health care measures appropriate at the community level in Ghana and will give residents experience working in district hospitals (61).

Training also should acquaint physicians with the principles and methods of traditional medicine in the area where they will practice. Most people in developing countries turn first to traditional practitioners when they have health concerns. Also, many traditional practices may be helpful. Increasingly, maternal health programs involve traditional practitioners. They recognize that physicians who work with traditional populations need to understand their beliefs so that they can communicate with clients. For these reasons medical schools in China, Ghana, Mali, and Nigeria offer some theoretical and practical training in traditional medicine (361).

Training traditional practitioners to help provide modern health care and training modern providers to work more effectively in the community—both these tasks can be vital to improving maternal health. Combined, the resources and commitment of the community and the modern health care delivery system can save mothers' lives and prevent illness. Because almost every woman is pregnant at some time and because many women will see few other modern health care providers, maternal health programs face both challenge and opportunity—the challenge to reach all women with good care and the opportunity to make women's lives healthier, safer, and happier.

BIBLIOGRAPHY

An asterisk (*) denotes an item that was particularly useful in the preparation of this issue of **Population Reports**.

1. ABBAS, A.A. and WALKER, G.J.A. Determinants of the utilization of maternal and child health services in Jordan. International Journal of Epidemiology 15(3): 404–407. 1986.
2. ADAIR, L.S. and POPKIN, B.M. Birth weight, maturity and proportionality in Filipino infants. Human Biology 60(2): 319–339. Apr. 1988.
3. ADEEB, N. The pattern of maternal mortality at Maternity Hospital Kuala Lumpur. Malaysian Journal of Reproductive Health 1(1): 24–39. Jan. 1983.
4. AITKEN, I.W., KARGBO, T.K., and GBA-KAMARA, A.M. Planning a community-oriented midwifery service for Sierra Leone. World Health Forum 6(2): 110–114. 1985.
5. AITKEN, I.W. and WALLS, B. Maternal height and cephalopelvic disproportion in Sierra Leone. Tropical Doctor 16(3): 132–134. Jul. 1986.
6. AJELLO, C. (Johns Hopkins Program for International Education in Gynecology and Obstetrics) [Papua New Guinea health extension officer training]. Personal communication, Apr. 25, 1988.
7. AKINKUGBE, O.O. A third world perspective. World Health, Apr. 1987. p. 24–25.
* 8. ALAUDDIN, M. Maternal mortality in rural Bangladesh: the Tangail district. Studies in Family Planning 17(1): 13–21. Jan.–Feb. 1986.
9. ALISJAHBANA, A., NGANTUNG, W., TANUWIDJAJA, S., TJOKROHUSADA, H., and PRIMANA, D.A. The traditional birth attendant as a primary health care worker in MCH programs. Bangkok, Ford Foundation and Population Council, 1987. (Research Paper No. 6) 22 p.
10. AMERICAN COLLEGE OF NURSE-MIDWIVES (ACNM). Manual for the training of traditional birth attendants. 3rd revision. Washington, D.C., ACNM, Jul. 1984. 91 p.
11. AMPOFO, D.A. Causes of maternal death and comments, Maternity Hospital, Accra 1963–1967. West African Medical Journal 18(3): 75–81. Jun. 1969.
12. ARAL, S.O. and GUINAN, M.E. Women and sexually transmitted diseases. In: Holmes, K.K., Mårdh, P.-A., Sparling, P.F., and Wiesner, P.J., eds. Sexually transmitted diseases. New York, McGraw-Hill, 1984. p. 85–89.
* 13. ARAUJO, G., ARAUJO, L., JANOWITZ, B., WALLACE, S., and POTTS, M. Improving obstetric care in Northeast Brazil. Bulletin of the Pan American Health Organization 17(3): 233–242. 1983.
14. ARKUTU, A.A. A clinical study of maternal age and parturition in 2791 Tanzanian primiparae. International Journal of Gynaecology and Obstetrics 16(1): 20–23. Jul.–Aug. 1978.
15. ARMON, P.J. Maternal deaths in the Kilimanjaro region of Tanzania. Transactions of the Royal Society of Tropical Medicine and Hygiene 73(3): 284–288. 1979.
16. ARRUDA, J.M., RUTENBERG, N., MORRIS, L., and FERRAZ, E.A. Pesquisa Nacional sobre Saude Materno-Infantil e Planejamento Familiar Brasil—1986. [Brazil National Survey of Maternal and Child Health and Family Planning—1986.] [POR] Rio de Janeiro and Columbia, Maryland. Sociedade Civil Bem-Estar Familiar no Brasil (BEMFAM), and Institute for Resource Development/Westinghouse, Dec. 1987. 234 p.
17. ASHWORTH, A. and FEACHEM, R.G. Interventions for the control of diarrhoeal diseases among young children: prevention of low birth weight. Bulletin of the World Health Organization 63(1): 165–184. 1985.
18. ATPUTHARAJAH, V. Tubal pregnancy: a review of aetiological factors in 117 cases. Singapore Journal of Obstetrics and Gynaecology 13(1): 78–81. Mar. 1982.
19. ATRASH, H.K., HUGHES, J.M., and HOGUE, C.J.R. Ectopic pregnancy in the United States, 1970–1983. Morbidity and Mortality 35(2SS): 29SS-37SS. Aug. 1986.
20. ATTAH, E.B. Underutilization of public sector health facilities in Imo State, Nigeria: a study with focus groups. Washington, D.C., World Bank, Jan. 1986. (PHN Technical Note

86–1) 17 p.
21. AZIZ, F.A. Pregnancy and labor of grand multiparous Sudanese women. International Journal of Gynaecology and Obstetrics 18(2): 144–146. 1980.
22. BAASHER, S., BAASHER, T., and COOK, R. Traditional practices for women and young children in the Eastern Mediterranean Region: recent developments. In: Jelliffe, D.B. and Jelliffe, E.F.P., eds. Advances in international maternal and child health. Vol 3. Oxford, Oxford University Press, 1983. p. 63–89.
23. BADEN, T. A review of female genital operations: a look at the practice in Sierra Leone and its effects on the second stage of labor. May 27, 1986. 40 p. (Unpublished)
24. BAILEY, P.E., SAAVEDRA, L.L., KUSHNER, L., WELSH, M., and JANOWITZ, B. Estudio hospitalario del aborto ilegal en Bolivia. [A hospital study of illegal abortion in Bolivia.] [SPA, summary in ENG] Boletin de la Oficina Sanitaria Panamericana 104(2): 144–159. Feb. 1988.
* 25. BAKER, S.J. and DE MAEYER, E.M. Nutritional anemia: its understanding and control with special reference to the work of the World Health Organization. American journal of Clinical Nutrition 32(2): 368–417. Feb. 1979.
26. BAMISAIYE, A. Selected factors influencing the coverage of an MCH clinic in Lagos, Nigeria. Journal of Tropical Pediatrics 30: 256–261. Oct. 1984.
27. BAMISAIYE, A., RANSOME-KUTI, O., and FAMUREWA, A.A. Waiting time and its impact on service acceptability and coverage at an MCH clinic at Lagos, Nigeria. Journal of Tropical Pediatrics 32: 158–161. Aug. 1986.
28. BANSAL, Y.P. Pre-eclampsia/eclampsia: a profile from Pumwani Maternity Hospital, Nairobi, Kenya. East African Medical Journal 62(10): 691–699. Oct. 1985.
29. BARSS, P. and BLACKFORD, C. Grand multiparity: benefits of a referral program for hospital delivery and postpartum tubal ligation. Papua New Guinea Medical Journal 28(1): 35–38. Mar. 1985.
30. BAYOUMI, A. The training and activity of village midwives in the Sudan. Tropical Doctor 6(3): 118–125. Jul. 1976.
31. BEGUM, S.F., NAHAR, K., JAHAN, F.A., and KHAN, A.R. A comparative study of the pattern of maternity care services in different hospitals and clinics in Bangladesh. Presented at the 8th Asian and Oceanic Congress of Obstetrics and Gynecology, Oct. 25–31, 1981. 16 p.
32. BELIZAN, J.M., LECHTIG, A., and VILLAR, J. Distribution of low-birth weight babies in developing countries. American Journal of Obstetrics and Gynecology 132(6): 704–705. Nov. 15, 1978.
33. BELLA, H. Sudanese village midwives: six decades of experience with part-time health workers. In: Jelliffe, D.B. and Jelliffe, E.F.P., eds. Advances in international maternal and child health: Vol. 4. 1984. Oxford, Clarendon Press, 1984. p. 124–148.
34. BELLA, H. and EBRAHIM, G.J. The village midwives of the Sudan: an enquiry into the availability and quality of maternity care. Journal of Tropical Pediatrics 30(2): 115–118. Apr. 1984.
35. BELSEY, M. (World Health Organization) [Training in obstetrics for doctors and nurses] Personal communication, Apr. 25, 1988.
36. BELSEY, M.A. and ROYSTON, E. Overview of the health of women and children. New York, Population Council, Jun. 1987. 67 p.
37. BENENSON, A.S., ed. Control of communicable diseases in man. 14th ed. Washington, D.C., American Public Health Association, 1985. 485 p.
38. BENSON, R.C. Handbook of obstetrics and gynecology. 8th ed. Los Altos, California, Lange Medical, 1983. 804 p.
39. BENTSI, C., KLUFIO, C.A., PERINE, P.L., BELL, T.A., CLES, L.D., KOFSTER, C.M., and WANG, S.-P. Genital infections with *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in Ghanaian women. Genitourinary Medicine 61(1): 48–50. Feb. 1985.
40. BERGGREN, G.G., BERGGREN, W., GARNIER, N., PETERSON, W., EWBANK, D., and DIEUDONNE, W. Traditional midwives, tetanus immunization, and infant mortality in rural Haiti. Tropical Doctor 13(2): 79–87. Apr. 1983.
41. BERREBI, A., PUEL, J., TRICOIRE, J., GRANDJEAN, H., HERNE, P., and PONTONNIER, G. The influence of pregnancy on the evolution of HIV infection. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 270.
42. BHATIA, J.C. Impact of training on the performance of traditional birth attendants—a study in Maharashtra State. Journal of Family Welfare 32(3): 50–61. Dec. 1985.
* 43. BHATIA, J.C. Maternal mortality in Anantapur district, India: preliminary findings of a study. Geneva, World Health Organization, Nov. 1985. 24 p.
44. BHATIA, S. Traditional practices affecting female health and survival: evidence from countries of South Asia. In: Lopez, A.D. and Ruzicka, L.T., eds. Sex differentials in mortality: trends, determinants and consequences. Canberra, Australia, Australian National University, 1983. (Miscellaneous Series No. 4) p. 165–177.
45. BLACKER, J.G.C. Health impacts of family planning. Health Policy and Planning 2(3): 193–203. 1987.
46. BOTHWELL, T.H. and CHARLTON, R.W. Iron deficiency in women. Washington, D.C., International Nutritional Anemia Consultative Group, Apr. 1981. 68 p.
47. BOTSWANA. MINISTRY OF HEALTH (MOH). Botswana obstetric record. [Patient record form] [Gaborone], Botswana, MOH, 1984. (MH 022) 15 p.
48. BOULOS, R., HALSEY, N., BRUTUS, J.R., HOLT, E., RUFF, A., QUINN, T., and BOULOS, C. Risk factors for HIV-1 infection in pregnant Haitian women. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 344.
49. BRABIN, B.J. An analysis of malaria in pregnancy in Africa. Bulletin of the World Health Organization 61(6): 1005–1016. 1983.
50. BREMAN, J. (US Centers for Disease Control) [Malaria chemoprophylaxis in pregnant women] Personal communication, June 2, 1988.
51. BRUCE-CHWATT, L.J. Malaria and pregnancy. British Medical Journal 286(6376): 1457–1458. May 7, 1983.
52. BRUN-VEZINET, F., PEETERS, M., GUINDO, A., MAIGA, Y., SANGARE, A., and OEUVRES HOSPITALIERES FRANÇAISES DE L'ORDRE DE MALTE. HIV1 and HIV2 in Mali. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 319.
53. BRUNHAM, R.C., HOLMES, K.K., and ESCHENBACH, D. Sexually transmitted diseases in pregnancy. In: Holmes, K.K., Mårdh, P.-A., Sparling, P.F., and Wiesner, P.J., eds. Sexually transmitted diseases. New York, McGraw-Hill, 1984. p. 782–816.
54. BUCHERL, H. and FROSNER, G.G. Low prevalence of HIV-1 infection in a rural area of Kenya. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 327.
55. BULLEY, M. Early childhood marriage and female circumcision in Ghana. In: Senegal. Ministry of Public Health (SMOH) and The Non-Governmental Organizations' (NGO) Working Group on Traditional Practices Affecting the Health of Women and Children. Traditional practices affecting the health of women and children in Africa. [Dakar], Senegal, and Geneva, SMOH and NGO, Working Group, 1984. p. 211–214.
56. BULLOUGH, C.H.W. Analysis of maternal deaths in the central region of Malawi. East African Medical Journal 58(1): 25–36. Jan. 1981.
57. BULLOUGH, C.H.W. Towards more effective use of primary health care technologies at the family and community levels. Geneva, World Health Organization, 1985. (Working Paper No. 1) 36 p.
58. BURGESS, H.A. Use of the labor graph in Malawi. Journal of Nurse-Midwifery 31(1): 46–52. Jan.-Feb. 1986.
59. CAAN, B., HORGEN, D.M., MARGEN, S., KING, J.C., and JEWELL, N.P. Benefits associated with WIC supplemental feeding during the interpregnancy interval. American Journal of Clinical Nutrition 45(1): 29–41. Jan. 1987.
60. CARDOSO, U.F. Giving birth is safer now. World Health Forum 7(4): 348–352. 1986.
61. CARNEGIE CORPORATION. Outline of strategy for HRDC program—MCH component. [1988.] 23 p. (Unpublished)
62. CARSWELL, J.W. HIV infection in healthy persons in Uganda. AIDS 1(4): 223–227. 1987.
63. CATES, W., FARLEY, T.M.M., and ROWE, P.J. Worldwide patterns of infertility: is Africa different? Lancet 2(8455): 596–598. Sep. 14, 1984.
64. CENTERS FOR DISEASE CONTROL (CDC). Family planning methods and practice: Africa. Atlanta, Georgia, CDC, 1983. 329 p.
65. CHABOT, H.T.J. and EGGENS, K.H. Antenatal card for illiterate traditional birth attendants. Tropical Doctor 16(2): 75–78. Apr. 1986.
66. CHAROENLARP, P., DHANAMITTA, S., KAEWVICHIT, R., et. al. A WHO collaborative study on iron supplementation in Burma and in Thailand. American Journal of Clinical Nutrition 47: 280–297. 1988.
67. CHAULIAC, M. and MASSE-RAIMBAULT, A.M. Women's lives, mothers' health. Children in the Tropics 159: 2–56. 1985.
* 68. CHEN, L.C., HUQ, E., and D'SOUZA, S. Sex bias in the family allocation of food and health care in rural Bangladesh. Population and Development Review 7(1): 55–70. Mar. 1981.
69. CHEN, P.-C. and KOLS, A. Population and birth planning in the People's Republic of China. Population Reports, Series J, No. 25. Baltimore, Johns Hopkins University, Population Information Program, Jan.-Feb. 1982. 44 p.
70. CHEN, R.-J. Maternal mortality in Shanghai, China. Geneva, World Health Organization, Nov. 1985. 10 p.
71. CHEW, S.Y. A 6 year review of ectopic pregnancy. Singapore Medical Journal 20(3): 395–398. Sep. 1979.
* 72. CHI, I.-C., AGOESTINA, T., and HARBIN, J. Maternal mortality at twelve teaching hospitals in Indonesia: an epidemiologic analysis. International Journal of Gynaecology and Obstetrics 19(4): 259–266. Aug. 1981.
73. CHI, I.-C., WHATLEY, A., WILKENS, L., and POTTS, M. In-hospital maternal mortality risk by cesarean and vaginal deliveries in two less developed countries—a descriptive study. International Journal of Gynaecology and Obstetrics 24: 121–131. 1986.
74. CHIEH-JOHNSON, D., CROSS, A.R., WAY, A.A., and SULLIVAN, J.M. Liberia demographic and health survey 1986. Monrovia, Liberia, and Columbia, Maryland, Republic of Liberia, Bureau of Statistics, and Institute for Resource Development/Westinghouse, Feb. 1988. 117 p.
75. CHILE. MINISTERIO DE SALUD. Información básica en salud. [Basic information on health.] [SPA, ENG] [Santiago,] Chile, Ministerio de Salud, 1980. 13 p.
76. CHIPHANGWI, J., KELLER, M., WIRIMA, J., NDOVI, E., TAYLOR, E., SAAH, A., and POLK, B.F. Prevalence of HIV-1 infection in pregnant women in Malawi. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 324.
77. CHRISTIE, A.B., ALLAM, A.A., AREF, M.K., MUNTASSER, I.H. el, NAGEH, M. el-. Pregnancy hepatitis in Libya. Lancet 2(7990): 827–829. Oct. 16, 1976.
78. CLAQUIN, P., CLAQUIN, B., RAHMAN, S., RAZZAQUE, M.A., SHAIKH, K., CHOWDHURY, T.R., and KANAWATI, N.H. An evaluation of the government training programme of traditional birth attendants. Dacca, Bangladesh, International Centre for Diarrhoeal Disease Research, Bangladesh, May 1982. (Special Publication No. 18) 78 p.
79. CLELAND, J.G. and SATHAR, Z.A. The effect of birth spacing on childhood mortality in Pakistan. Population Studies 38(3): 401–418. Nov. 1984.
80. COLOMBIA. CENTRAL REGION CORPORATION OF POPULATION (CCRP). MINISTRY OF HEALTH (MOH), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta de Prevalencia Demografica y Salud 1986. [Demographic and Health Survey 1986.] [SPA] Bogotá, Colombia, and Columbia, Maryland, CCRP, MOH, and IRD, 1986. 150 p.
81. COSMINSKY, S. Traditional midwifery and contraception. In: Bannerman, R.H., Burton, J., and Ch'en, W.-C., eds. Traditional medicine and health care coverage: a reader for health administrators and practitioners. Geneva, World Health Organization, 1983. p. 142–162.
82. COSTELLO, E. and DUNCAN, G.R. The partogram: graphic guide to progress. New Zealand Nursing Journal 69(10): 7–9. Oct. 1975.
83. CROWTHER, C.A. Eclampsia at Harare Maternity Hospital: an epidemiological study. South African Medical Journal 68(13): 927–929. Dec. 21, 1985.
84. CROWTHER, C.A. Management and pregnancy outcome in eclampsia at Harare Maternity Hospital. Central African Journal of Medicine 31(6): 107–109. Jun. 1985.
85. DATTA, K.K., SHARMA, R.S., RAZACK, P.M.A., GHOSH, T.K., and ARORA, R.R. Morbidity pattern amongst rural pregnant women in Alwar, Rajasthan—a cohort study. Health and Population—Perspectives and Issues 3(4): 282–292. Oct.-Dec. 1980.
86. DAVIDSON, J.R. The evaluation of the effectiveness of the Peruvian midwife training program. Apr. 15, 1983. 164 p. (Unpublished)
87. DAVIES, A.M. and DUNLOP, W. Hypertension in pregnancy. In: Barron, S.L. and Thomson, A.M., eds. Obstetrical epidemiology. New York, Academic, 1983. p. 167–208.
88. DE MAEYER, E. and ADIELS-TEGMAN, M. The prevalence of anaemia in the world. World Health Statistics Quarterly 38(3): 302–316. 1985.
89. DE MUYLDER, X. Vaginal delivery after caesarean section: is it safe in a developing country? Australia and New Zealand Journal of Obstetrics and Gynaecology 28: 99–102. 1988.
90. DENIS, F., BARIN, F., GERSHY-DAMET, G., REY, J.-L., LHUILLIER, M., MOUNIER, M., LEONARD, G., SANGARE, A., GOUDEAU, A., M'BOUP, S., ESSEX, M., and KANKI, P. Prevalence of human T-lymphotropic retroviruses Type III (HIV) and Type IV in Ivory Coast. Lancet 1(8530): 408–411. Feb. 21, 1987.
91. DERVISOGLU, A. Maternal mortality in Turkey. Nov. 1985. 17 p. (Unpublished)
92. DOMINICAN REPUBLIC. CONSEJO NACIONAL DE POBLACION Y FAMILIA (CONAPOFA), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Demografica y de Salud: DHS-86. [Dominican Republic Demographic and Health Survey: DHS-86.] [SPA] Santo Domingo, Dominican Republic and Columbia, Maryland, CONAPOFA and IRD, Dec. 1987. 139 p.
93. DONALDSON, P.J. and BILLY, J.O.G. The impact of prenatal care on birth weight: evidence from an international data set. Medical Care 22(2): 177–188. Feb. 1984.
94. DORFMAN, S.F. Deaths from ectopic pregnancy, United States 1979 to 1980. Obstetrics and Gynecology 62(3): 334–338. Sep. 1983.
95. DREIZEN, S., SPIRAKIS, C.N., and STONE, R.E. A comparison of skeletal growth and maturation in undernourished and well-nourished girls before and after menarche. Journal of Pediatrics 70(2): 256–263. Feb. 1967.
96. DU GAS, B., MANGAY-MAGLACAS, A., PIZURKI, H., and SIMONS, J. Traditional birth attendants: a field guide to their training, evaluation, and articulation with health services. Geneva, World Health Organization, 1979. 109 p.
* 97. DUALE, S., NELSON, G., HERMANN, C.B., and WRIGHT, S. Pregnancy care monitoring: Karawa Health Zone, Zaire: final report 1988. Research Triangle Park, North Carolina, Family Health International, 1988. 172 p.
98. DURNIN, J.V.G.A. Energy requirements of pregnancy: an integrated study in five countries: background and methods. Lancet 2(8564): 895–896. Oct. 17, 1987.
99. DURNIN, J.V.G.A. Energy requirements of pregnancy: an integration of the longitudinal data from the five-country study. Lancet 2(8568): 1131–1133. Nov. 14, 1987.
100. EARLE, D. (Population Services International) [Delivery kits in Bangladesh] Personal communication, Jul. 18, 1988.
101. ECUADOR. CENTRO DE ESTUDIOS DE POBLACION Y PATERNIDAD RESPONSABLE (CEPAR), and INSTITUTO NACIONAL DE INVESTIGACIONES NUTRICIONALES Y MEDICO SOCIALES (ININMS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Ecuador Encuesta Nacional de Demografía y Salud Familiar 1987: informe preliminar. [Ecuador Demographic and Health Survey 1987: preliminary report.] [SPA] [Quito], Ecuador and Columbia, Maryland, CEPAR, ININMS, and IRD, Jul. 1987. 25 p.
102. EGULLION, C. Training traditional midwives in Manicaland, Zimbabwe. International Journal of Gynaecology and Obstetrics 23(4): 287–290. 1985.
103. EGWUATU, V.E. Childbearing among the Igbos of Nigeria. International Journal of Gynaecology and Obstetrics 24(2): 103–109. Apr. 1986.
104. EL SALVADOR. ASOCIACION DEMOGRAFICA SALVADORENA (ADS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Nacional de Salud Familiar FESAL—85. [El Salvador National Survey of Family Health 1985.] [SPA] San Salvador, El Salvador and Columbia, Maryland, Westinghouse, ADS and IRD, Sep. 1987. 179 p.

105. ELKINS, T., ONWUKA, E., STOVALL, T., HAGOOD, M., and OSBORN, D. Uterine rupture in Nigeria. Journal of Reproductive Medicine 30(3): 195–199, Mar. 1985.
106. ELKINS, T.E., DRESCHER, C., MARTEY, J.O., and FORT, D. Vesicovaginal fistula revisted. Obstetrics and Gynecology 72(3, Pt.1): 307–312, Sep. 1988.
107. ELLIOTT, T.C. Iodine deficiency disorders. Directions 7(1): 1–12. 1987.
108. ESCHENBACH, D.A. and WAGER, G.P. Puerperal infections. Clinical Obstetrics and Gynecology 23(4): 1005–1037, Dec. 1980.
109. ESSEX, B.J. and EVERETT, V.J. Use of an action-orientated record card for antenatal screening. Tropical Doctor 7: 134–138, Jul. 1977.
110. EVERETT, J. Obstetric care. British Medical Journal 288(6430): 1600–1602, May 26, 1984.
111. EVERETT, J. Obstetric emergencies. Nairobi, African Medical and Research Foundation, Mar. 1987. 29 p.
112. EVOH, N.J. and AKINLA, O. Reproductive performance after the repair of obstetric vesico-vaginal fistulae. Annals of Clinical Research 10: 303–306. 1978.
113. FALL, I. Matrones et maternites rurales au Senegal. [Traditional birth attendants and rural maternity in Senegal.][FRE] Carnets de l'Enfance 28: 17–28, Oct.-Dec. 1974.
114. FALLIS, G.B. Obstetrics in a rural African population. East African Medical Journal 63(1): 54–62, Jan. 1986.
115. FAMILY HEALTH INTERNATIONAL. Improving maternal care reduces mortality. Network 9(1): 6–7. Fall 1987.
116. FAMILY HEALTH INTERNATIONAL. Pregnancy surveillance studies in Africa. Network 7(3): 1–3. Spring 1986.
117. FAUNDES, A., RODRIGUEZ-GALANT, G., and AVENDANO, O. The San Gregorio experimental family planning program: changes observed in fertility and abortion rates. Demography 5(2): 836–845. 1968.
118. FAUVEAU, V. and CHAKRABORTY, J. Maternity care in Matlab: present status and possible interventions. Dhaka, Bangladesh, International Centre for Diarrhoeal Disease Research, Jan. 1988. 53 p.
* 119. FAVIN, M., BRADFORD, B., and CEBULA, D. Improving maternal health in developing countries. Geneva, World Federation of Public Health Associations, Aug. 1984. 60 p.
120. FEACHEM, R.G. Non-clinical interventions for diarrhoea control: effectiveness and costs. Presented at the 2nd International Conference on Oral Rehydration Therapy. Washington, D.C., Dec. 10–13, 1985. 24 p.
121. FLEMING, A.F. Iron deficiency in the tropics. Clinics in Haematology 11(2): 365–388. Jun. 1982.
122. FORTNEY, J. (Family Health International). [Community response to maternal death in Guinea-Bissau]. Personal communication, Oct. 1988.
* 123. FORTNEY, J.A., SUSANTI, I., GADALLA, S., SALEH, S., FELDBLUM, P.J., and POTTS, M. Maternal mortality in Indonesia and Egypt. International Journal of Gynecology and Obstetrics 26(1): 21–32. Feb. 1988.
124. FORTNEY, J.A., SUSANTI, I., GADALLA, S., SALEH, S., ROGERS, S.M., and POTTS, M. Reproductive mortality in two developing countries. American Journal of Public Health 76(2): 134–138. Feb. 1986.
125. FRAME, S., MOORE, J., PETERS, A., and HALL, D. Maternal height and shoe size as predictors of pelvic disproportion: an assessment. British Journal of Obstetrics and Gynaecology 92(12): 1239–1245. Dec. 1985.
126. FRIEDLAND, G.H. and KLEIN, R.S. Transmission of the human immunodeficiency virus. New England Journal of Medicine 317(18): 1125–1135. Oct. 29, 1987.
127. FROST, O. Maternal and perinatal deaths in an Addis Ababa Hospital, 1980. Ethiopian Medical Journal 22(3): 143–146. Jul. 1984.
128. FUCHS, K., PERETZ, B., A. MARCOVICI, R., PALDI, F., and TIMOR-TRITSH, I. The "grand multipara"—is it a problem? A review of 5785 cases. International Journal of Gynaecology and Obstetrics 23: 321–325. 1985.
129. GALLEN, M.E. and RINEHART, W. Operations research: lessons for policy and programs. Population Reports, Series J, No. 31. Baltimore, Johns Hopkins University, Population Information Program, May-Jun. 1986. 36 p.
130. GALWAY, K., WOLFF, B., and STURGIS, R. Child survival: risks and the road to health. Columbia, Maryland, Westinghouse Institute for Resource Development, Mar. 1987. 101 p.
131. GAY, J. A literature review of the client-provider interface in maternal and child health and family planning clinics in Latin America. Washington, D.C., Pan American Health Organization, Nov. 1980. 78 p.
132. GILLES, H.M., LAWSON, J.B., SIBELAS, M., VOLLER, A., and ALLAN, N. Malaria, anaemia and pregnancy. Annals of Tropical Medicine and Parasitology 63(2): 245–263. 1969.
133. GOETHE, W. Problems of HIV infection for women in Africa. IPPF Medical Bulletin 22(3): 1–3. Jun. 1988.
134. GRAHAM, W. and AIREY, P. Measuring maternal mortality: sense and sensitivity. Health Policy and Planning 2(4): 323–331. 1987.
135. GRAHAM, W., BRASS, W., and SNOW, R.W. Indirect estimation of maternal mortality: the sisterhood method. London, Centre for Population Studies, London School of Hygiene and Tropical Medicine, Apr. 1988. (CPS Research Paper 88-1) 33 p.
136. GREENBERG, L. Midwife training programs in highland Guatemala. Social Science and Medicine 16(18): 1599–1609. 1982.
137. GREENWOOD, A.M., GREENWOOD, B.M., BRADLEY, A.K., WILLIAMS, K., SHENTON, F.C., TULLOCH, S., BYASS, P., and OLDFIELD, F.S.J. A prospective survey of the outcome of pregnancy in a rural area of The Gambia. Bulletin of the World Health Organization 65(5): 633–643. 1987.
138. GROEN, G.P. Uterine rupture in rural Nigeria: review of 144 cases. Obstetrics and Gynecology 44(5): 682–687. Nov. 1974.
139. GUILKEY, D.K., POPKIN, B.M., AKIN, J.S., and WONG, E.L. Prenatal care and pregnancy outcome in Cebu, Philippines. Journal of Development Economics. (In press)
140. HAKIM, S. El. Sudan: replacing TBAs by village midwives. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. (Public Health Papers No. 75) p. 131–166.
141. HAKIM, S.Y. El. Village midwives in the Sudan. In: Philpott, R.H., ed. Maternity services in the developing world—what the community needs. London, Royal College of Obstetricians and Gynaecologists, 1980. p. 282–291.
* 142. HAMILTON, S., POPKIN, B., and SPICER, D. Women and nutrition in Third World countries. New York, Praeger, 1984. 147 p.
143. HAMLIN, R.H.J. and NICHOLSON, E.C. Experiences in the treatment of 600 vaginal fistulas and in the management of 80 labours which have followed the repair of these injuries. Ethiopian Medical Journal 4(1): 189–192. Oct. 1965.
144. HARLAP, S., KAUFMAN, R., PRYWES, R., DAVIES, A.M., STERK, V.V., and WEISKOPF, P. Patterns of obstetric intervention in a total population: a report from the Jerusalem Perinatal Study. Israel Journal of Medical Sciences 7(10): 1115–1127. 1971.
145. HARRISON, K.A. Approaches to reducing maternal and perinatal mortality in Africa. In: Philpott, R.H., ed. Maternity services in the developing world—what the community needs. London, Royal College of Obstetricians and Gynaecologists, 1980. p. 52–95.
* 146. HARRISON, K.A. Child-bearing, health and social priorities: a survey of 22,774 consecutive hospital births in Zaria, northern Nigeria. British Journal of Obstetrics and Gynaecology (Suppl. 5): 1–119. Oct. 1985.
147. HARRISON, K.A. Children crippled by childbirth. People 14(3): 12–13. 1987.
148. HARRISON, K.A. and ROSSITER, C.E. Maternal mortality. British Journal of Obstetrics and Gynaecology 92(Suppl. 5): 100–115. Oct. 1985.
149. HARRISON, K.A. and ROSSITER, C.E. Multiple pregnancy. British Journal of Obstetrics and Gynaecology 92(Suppl. 5): 49–60. Oct. 1985.
150. HARRISON, K.A., ROSSITER, C.E., CHONG, H., LISTER, U.G., BANO, Q., BRIGGS, N.D., EKWEMPU, C.C., and MEMBERR, M.T. The influence of maternal age and parity on child-bearing with special reference to primigravidae aged 15 years and under. British Journal of Obstetrics and Gynaecology (Suppl. 5): 23–31. Oct. 1985.
151. HARTFIELD, V.J. and WOODLAND, M. Prevention of maternal death in a Nigerian village. International Journal of Gynaecology and Obstetrics 18(2): 150–152. Sep.-Oct. 1980.
152. HASAN, A.A. Ectopic pregnancy: a seven-year survey. European Journal of Obstetrics, Gynecology and Reproductive Biology 16(4): 237–241. Dec. 1983.
153. HAUB, C. and KENT, M.M. World population data sheet of the Population Reference Bureau, Inc.: demographic data and estimates for the countries and regions of the world. Washington, D.C., Population Reference Bureau, Apr. 1988. 5 p.
154. HAY, D.M. and BOYD, J.J. A study of the obstetric performance of the adolescent Jamaican primigravida. American Journal of Obstetrics and Gynecology 116(1): 34–38. May 1, 1973.
155. HEATH, K., MARTINEZ, D., and SHEON, A.R. Trinidad and Tobago Demographic and Health Survey 1987: preliminary report. [Port-of-Spain], Trinidad and Tobago, and [Columbia, Maryland], Family Planning Association of Trinidad and Tobago and Institute for Resource Development/Westinghouse, Jan. 1988. 22 p.
156. HEIBY, J.R. and MONTEITH, R.S. Resource support services report, year-end evaluation of the project, community-based distribution of contraceptives and selected health supplies, Nicaragua. Dec. 5–14, 1977. [Memorandum]. Washington, D.C., US Department of Health, Education and Welfare, Jan. 20, 1978. 41 p. (Mimeo)
157. HENDRICKSE, R.G. Malaria and child health. Annals of Tropical Medicine and Parasitology 81(5): 499–509. 1987.
158. HENRY, A. and PIOTROW, P.T. Age at marriage and fertility. Population Reports, Series M, No. 4. Baltimore, Johns Hopkins University, Population Information Program, Nov. 1979. 56 p.
* 159. HERZ, B. and MEASHAM, A.R. The safe motherhood initiative: proposals for action. Washington, D.C., World Bank, 1987. 52 p. (Mimeo)
160. HETZEL, B.S. Iodine deficiency disorders (IDD): a maternal and child health issue. In: Jelliffe, D.B. and Jelliffe, E.F.P., eds. Advances in International Maternal and Child Health. Oxford, Clarendon Press, 1986. (Vol. 6) p. 79–120.
161. HOBCRAFT, J., MCDONALD, J., and RUTSTEIN, S. Child-spacing effects on infant and early child mortality. Population Index 49(4): 585–618. Winter 1983.
162. HOBCRAFT, J.N., MCDONALD, J.W., and RUTSTEIN, S.O. Demographic determinants of infant and early child mortality: a comparative analysis. Population Studies 39(3): 363–385. Nov. 1985.
163. HOGBERG, U., WALL, S., and BROSTROM, G. The impact of early medical technology on maternal mortality in late 19th century Sweden. International Federation of Gynaecology and Obstetrics 24(4): 251–261. Aug. 1986.
164. HONG, S. Guidelines for evaluating TBA training programmes. New York, United Nations Children's Fund, Jan. 1987. 49 p.
* 165. HONG, S. Review of training programmes for traditional birth attendants in selected countries. New York, United Nations Children's Fund, Jan. 1987. 47 p. 166.
166. HUERTA, J.A. and KELLER, A. La partera empírica: colaboradora potencial del programa nacional de salud materno-infantil y planificación familiar? [The traditional midwife: can she be incorporated into a pilot maternal and child health and family planning program?][SPA, ENG] Salud Publica de Mexico 18(5): 883–892. Sep.-Oct. 1976.
167. HUFFMAN, S. and KRASOVEC, K. Maternal nutritional risk assessment. Washington, D.C., Center to Prevent Childhood Malnutrition, Aug. 1986. 50 p.
168. INDIA FAMILY HEALTH FOUNDATION (IFHF). Self-instructional module on care during pregnancy. New Delhi, IFHF, [1981]. 45 p.
* 169. INSTITUTE FOR DEVELOPMENT TRAINING (IDT). Health effects of female circumcision. Chapel Hill, North Carolina, IDT, 1986. (Training Course in Women's Health Module 5) 45 p.
170. INSTITUTE FOR DEVELOPMENT TRAINING (IDT). Vaginal infections and sexually transmitted diseases: Module 4. Chapel Hill, North Carolina, IDT, 1983. 78 p. (Mimeo)
171. INTERNATIONAL FERTILITY RESEARCH PROGRAM (IFRP). Maternity record data book. Research Triangle Park, North Carolina, IFRP, [1982]. 364 p. (Mimeo)
172. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Family planning in Chile: a profile of the development of policies and programmes. London, IPPF, [1980]. 25 p.
173. IZUORA, G.I. Aetiology of mental retardation in Nigerian children around Enugu. Central African Journal of Medicine 31(1): 13–16. Jan. 1985.
174. JACKSON, R.T. and LATHAM, M.C. Anemia of pregnancy in Liberia, West Africa: a therapeutic trial. American Journal of Clinical Nutrition 35(4): 710–714. Apr. 1982.
* 175. JANOWITZ, B., LEWIS, J., BURTON, [illegible], and LAMPTEY, P., eds. Reproductive health in Africa: issues and options. Research Triangle Park, North Carolina, Family Health International, 1984. 70 p.
176. JANOWITZ, B., WALLACE, S., ARAUJO, G., and ARAUJO, L. Referrals by traditional birth attendants in northeast Brazil. American Journal of Public Health 75(7): 745–748. Jul. 1985.
177. JANOWITZ, B., WALLACE, S., ARAUJO, G., ARAUJO, L., BAILEY, P., and POTTS, M. Referrals by traditional birth attendants in Northeast Brazil. Presented at the 11th Annual NCIH International Health Conference, Arlington, Virginia, Jun. 10–13, 1984. 21 p.
178. JANZEN, S. Technology introduction: the safe birth example. Directions 8(2): 1–11. 1988.
179. JELLIFFE, D.B. The assessment of the nutritional status of the community (with special reference to field surveys in developing regions of the world). Geneva, World Health Organization (WHO), 1966. (WHO Monograph Series No. 53) 271 p.
180. JOHNSTONE, F.D., MACCALLUM, L., BRETTLE, R., INGLIS, J.M., and PEUTHERER, J.F. Does HIV infection affect pregnancy outcome? [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 218.
181. JORDAN, B. Modes of teaching and learning: some insights from the training of traditional midwives. Oct. 1987. 21 p. (Unpublished)
182. JUSTICE, J. Can socio-cultural information improve health planning? A case study of Nepal's assistant nurse-midwife. Social Science and Medicine 19(3): 193–198. 1984.
183. KAHN, S. (US AID). [Diagnosing anemia]. Personal communication, Oct. 26, 1988.
184. KAHN, S. (US AID). [Research on slow-release iron capsules: iron fortification of food]. Personal communication, Apr. and Sep. 1988.
185. KANE, M.A., BRADLEY, D.W., SHRESTHA, S.M., MAYNARD, J.E., COOK, E.H., MISHRA, R.P., and JOSHI, D.D. Epidemic non-A, non-B hepatitis in Nepal: recovery of a possible etiologic agent and transmission studies in marmosets. Journal of the American Medical Association 252(22): 3140–3145. Dec. 14, 1984.
186. KAPTUE, L., ZEKENG, L., MONNY-LOBE, and LANDO, M. Maternal-foetal transmission of HIV1 among pregnant women in 2 maternities in Yaounde—Cameroon. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 346.
187. KAUNITZ, A.M., SPENCE, C., DANIELSON, T.S., ROCHAT, R.W., and GRIMES, D.A. Perinatal and maternal mortality in a religious group avoiding obstetric care. American Journal of Obstetrics and Gynecology 150(7): 826–831. Dec. 1, 1984.
188. KELLY, J. Vesicovaginal fistulae. British Journal of Urology 51: 208–210. 1979.
189. KENNEDY, L. and RITTER, H. Antenatal records: do they help us? Tropical Doctor 14(3): 130–132. Jul. 1984.
* 190. KHAN, A.R., JAHAN, F.A., and BEGUM, S.F. Maternal mortality in rural Bangladesh: the Jamalpur District. Studies in Family Planning 17(1): 7–12. Jan.-Feb. 1986.
191. KHASIANI, S.A. Adolescent fertility in Kenya with special reference to high school teenage pregnancy and childbearing. 1985. 105 p. (Unpublished)
* 192. KOBLINSKY, M.A. and CORBETT, M. Reducing maternal mortality: program options. Presented at the Expert Consultation on Disease and Mortality in sub-Saharan Africa: Levels, Trends and Data Deficiencies, Tunbridge-Wells, England, Oct. 30-Nov. 3, 1987. 38 p.
* 193. KOENIG, M.A., FAUVEAU, V., CHOWDHURY, A.I., CHAKRABORTY, J., and KHAN, M.A. Maternal mortality in Matlab, Bangladesh: 1976–85. Studies in Family Planning 19(2): 69–80. Mar. 1988.
194. KOLS, A.J., WAWER, M.J., QUILLIN, W., and KINSEY, J. Community-based health and family planning. Population Reports, Series L, No. 3. Baltimore, Johns Hopkins University, Population Information Program, Nov.-Dec. 1982. 36 p.

195. KONAR, M., SIKDAR, K., BASAK, S., and LAHIRI, D. Maternal mortality: ten years' survey in Eden Hospital. Journal of the Indian Medical Association 75(3): 45–51. Aug. 1, 1980.
196. KRAMER, M.S. Determinants of low birth weight: methodological assessment and meta-analysis. Bulletin of the World Health Organization 65(5): 663–737. 1987.
197. KRASOVEC, K. (Pragma Corporation) [Arm circumference and maternal nutritional status] Personal communication, Oct. 28, 1988.
198. KUMAR, A. A comparative study of trained and untrained traditional birth attendants. Journal of Family Welfare 30(4): 85–91. Jun. 1984.
199. KWAST, B. A multitude of quiet tragedies. People 14(3): 14–16. 1987.
200. KWAST, B. (World Health Organization) [Maternal health nursing and midwifery training] Personal communication, Aug. 24, 1988.
201. KWAST, B.E. Maternity services and TBAs in Addis Ababa: biosocial factors related to birth place and outcome of pregnancy. Health Policy and Planning 3(2): 109–118. 1988.
202. KWAST, B.E. The role and training of midwives for rural areas. In: Philpott, R.H., ed. Maternity services in the developing world—what the community needs. London, Royal College of Obstetricians and Gynaecologists, 1980. p. 248–257.
* 203. KWAST, B.E., KIDANE-MARIAM, W., SAED, E.M., and FOWKES, F.G.R. Epidemiology of maternal mortality in Addis Ababa: a community-based study. Ethiopian Medical Journal 23(1): 7–16. Jan. 1985.
204. KWAST, B.E., KIDANE-MARIAM, W., SAED, E.M., and FOWKES, F.G.R. Report on maternal health in Addis Ababa, Sep. 1981-Sep. 1983: a community-based survey on the incidence and aetiology of maternal mortality and the use of maternity services; and confidential enquiries into maternal deaths in Addis Ababa, Ethiopia. Addis Ababa, Ethiopia, Swedish Save the Children Federation, 1984. 139 p.
205. KWAST, B.E. and STEVENS, J.A. Viral hepatitis as a major cause of maternal mortality in Addis Ababa, Ethiopia. International Journal of Gynaecology and Obstetrics 25: 99–106. 1987.
206. LADERMAN, C. Wives and midwives: childbirth and nutrition in rural Malaysia. Berkeley, California, University of California Press, 1983. 267 p.
207. LADIPO, O.A. History and overview of Oyo State community-based (CBD) programme: the pilot project. In: Conference on the Oyo State CBD Project: community-based delivery of health and family planning services, 1985: Ibadan, Nigeria. Ibadan, Nigeria, University College Hospital, [1985]. p. 39–49.
208. LALLEMANT, M., LALLEMANT, S., CHEYNIER, D., NZINGOULA, S., SINET, M., JOURDAIN, G., BRUN-VEZINET, F., GRISCELLI, C., and LAROUZ, B. HIV1 infection in an urban population of Congolese pregnant women. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 321.
209. LANCET. Maternal health in subsaharan Africa. [Editorial] Lancet 1(8527): 255–257. Jan. 31, 1987.
210. LANCET. Why retrain traditional birth attendants? [Editorial] Lancet 1(8318): 223–224. Jan. 29, 1983.
211. LARTSON, L.I., SODIPE, O.A., EBRAHIM, G.J., and ABEL, R. The trained traditional birth attendant: a study of her role in two cultures. Journal of Tropical Pediatrics 33(1): 29–34. Feb. 1987.
212. LASKER, J.N. Choosing among therapies: illness behaviors in the Ivory Coast. Social Science and Medicine 15A: 157–168. 1981.
213. LAWSON, J.B. Obstructed labour. In: Lawson, J.B. and Stewart, D.B. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 172–203.
214. LAWSON, J.B. Sequelae of obstructed labour. In: Lawson, J.B. and Stewart, D.B. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 203–218.
* 215. LAWSON, J.B. and STEWART, D.B. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. 630 p.
216. LECHTIG, A., HABICHT, J.-P., DELGADO, H., KLEIN, R.E., YARBROUGH, C., and MARTORELL, R. Effect of food supplementation during pregnancy on birthweight. Pediatrics 56(4): 508–520. Oct. 1975.
217. LECHTIG, A., MARTORELL, R., DELGADO, H., YARBROUGH, C., and KLEIN, R.E. Food supplementation during pregnancy, maternal anthropometry and birth weight in a Guatemalan rural population. Tropical Pediatrics and Environmental Child Health 24(5): 217–222. Oct. 1978.
218. LEDGER, W.J. Current problems in antibiotic treatment in obstetrics and gynecology. Reviews of Infectious Diseases 7(Suppl. 4): S679–S687. Nov.–Dec. 1985.
* 219. LEEDAM, E. Traditional birth attendants. International Journal of Gynaecology and Obstetrics 23(4): 249–274. Sep. 1985.
220. LEIGH, B. The use of partograms by maternal and child health aides. Journal of Tropical Pediatrics 32(3): 107–110. Jun. 1986.
221. LENNOX, C.E. Assessment of obstetric high risk factors in a developing country. Tropical Doctor 14(3): 125–129. Jul. 1984.
222. LESLIE, J. and GUPTA, G. Utilization of formal services for maternal nutrition and health care. [Draft] Washington, D.C., International Center for Research on Women, Aug. 1988. 89 p.
223. LEWIS, J.H., JANOWITZ, B., and POTTS, M. Methodological issues in collecting data from traditional birth attendants. International Journal of Gynaecology and Obstetrics 23: 291–303. 1985.
224. LLEWELLYN-JONES, D. Severe anaemia in pregnancy. Australian and New Zealand Journal of Obstetrics and Gynaecology 5(4): 191–197. Nov. 1965.
225. LONDON, K., CUSHING, J., CLELAND, J., ANDERSON, J.E., MORRIS, L., MOORE, S.H., and RUTSTEIN, S.O. Fertility and family planning surveys: an update. Population Reports, Series M, No. 8. Baltimore, Johns Hopkins University, Population Information Program, Sep.-Oct. 1985. 60 p.
226. LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, ROSS INSTITUTE. Malaria prevention in travellers from the United Kingdom: report of meetings convened by the Ross Institute. British Medical Journal 283(6285): 214–218. July 18, 1981.
227. MABEY, D.C.W., LLOYD-EVANS, N.E., CONTEH, S., and FORSEY, T. Sexually transmitted diseases among randomly selected attenders at an antenatal clinic in Gambia. British Journal of Venereal Diseases 58(3): 331–336. Jun. 1982.
228. MACCALLUM, L.R., FRANCE, A.J., JONES, M.E., STEEL, C.M., BURNS, S.M., BRETTLE, R.P., et al. The effects of pregnancy on the progression of H.I.V. infection. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 267.
229. MANGAY-MAGLACAS, A.M. and SIMONS, J., eds. The potential of the traditional birth attendant. Geneva, World Health Organization, 1986. (WHO Offset Publication No. 95) 105 p.
230. MAHMOOD, T.A., CAMPBELL, D.M., and WILSON, A.W. Maternal height, shoe size, and outcome of labour in white primigravidas: a prospective anthropometric study. British Medical Journal 297(): 515–517. Aug. 20–27, 1988.
231. MAHRAN, M. Medical dangers of female circumcision. IPPF Medical Bulletin 15(2): 1–3. Apr. 1981.
232. MAINE, D. Mothers in peril: the heavy toll of needless deaths. People 12(2): 6–8. 1985.
233. MAINE, D. and ROSENFIELD, A. Maternal and child health benefits of family planning. In: Sciarra, J.J., ed. Gynecology and obstetrics. Hagerstown, Maryland, Harper & Row, 1982. 12 p.
234. MAINE, D., ROSENFIELD, A., and WALLACE, M. Prevention of maternal deaths in developing countries: how much could family planning help? (Draft) 1986. 16 p. (Unpublished)
* 235. MAINE, D., ROSENFIELD, A., WALLACE, M., KIMBALL, A.M., KWAST, B., PAPIERNIK, E., and WHITE, S. Prevention of maternal deaths in developing countries: program options and practical considerations. Presented at the International Safe Motherhood Conference, Nairobi, Feb. 10–13, 1987. 50 p.
236. MAKAWA, M., MIEHAKANDA, J., SILOU, J., BOUITY, D.H., CHEYNIER, D., NSIMBA, B., BAKOUETELA, J., and LECKO, M. Seroepidemiology of HIV1 and HIV2 infections in pregnant women. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 344.
237. MAKOKHA, A.E. Maternal mortality—Kenyatta National Hospital 1972–1977. East African Medical Journal 57(7): 451–461. Jul. 1980.
238. MALEY, A. and AUMA, S. Ectopic pregnancy in Nairobi, Kenya. Scottish Medical Journal 15: 172–175. 1970.
239. MANGAY-ANGARA, A. Philippines: the development and use of the national registry of traditional birth attendants. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. (Public Health Papers No. 75) p. 37–95.
240. MARDONES-SANTANDER, F., ROSSO, P., STEKEL, A., AHUMADA, E., LLAGUNO, S., PIZARRO, F., SALINAS, J., VIAL, I., and WALTER, T. Effect of a milk-based food supplement on maternal nutritional status and fetal growth in underweight Chilean women. American Journal of Clinical Nutrition 47(3): 413–419. Mar. 1988.
241. MARSHALL, L.B. Influences on the antenatal clinic attendance of central province women in Port Moresby, PNG. Social Science and Medicine 21(3): 341–350. 1985.
242. MARTORELL, R. and GONZALEZ-COSSIO, T. Maternal-nutrition and birth weight. Yearbook of Physical Anthropology 30: 195–220. 1987.
243. MATI, J.K.G. Vesicovaginal fistula. In: Mati, J.K.G. and Ladipo, O.A., eds. Reproductive health in Africa. Baltimore, Johns Hopkins Program for International Education in Gynecology and Obstetrics, 1984. p. 181–191.
244. MCFALLS, J.A., Jr. and MCFALLS, M.H. Childbirth. In: Disease and fertility. Orlando, Florida, Academic Press, 1984. (Studies in Population) p. 427–438.
* 245. MCGREGOR, J.A., FRENCH, J.I., and SPENCER, N.E. Prevention of sexually transmitted diseases in women. Journal of Reproductive Medicine, Jan. 1988. p. 109–118.
246. MEASHAM, A.R., OBAIDULLAH, M., ROSENBERG, M.J., ROCHAT, R.W., KHAN, A.R., and JABEEN, S. Complications from induced abortion in Bangladesh related to types of practitioner and methods, and impact on mortality. Lancet 1(8213): 199–202. Jan. 24, 1981.
247. MEASHAM, A.R. and ROCHAT, R.W. Slowing the stork: better health for women through family planning. In: Better health for women and children through family planning. Abstracts: the key findings of 13 technical background papers. New York, Population Council, 1987. p. 27–31.
248. MEHEUS, A., RENIERS, J., and COLLETET, M. Determinants of infertility in Africa. African Journal of Sexually Transmitted Diseases 2(2): 31–35. Oct. 1986.
249. MHALU, F., BREDBERG-RADÉN, U., MBENA, E., PALLANGYO, K., KIANGO, J., MBISE, R., NYAMURYEKUNGE, K., and BIBERFELD, G. Prevalence of HIV infection in healthy subjects and groups of patients in Tanzania. AIDS 1: 217–221. 1987.
250. MHANGO, C., ROCHAT, R., and ARKUTU, A. Reproductive mortality in Lusaka, Zambia, 1982–1983. Studies in Family Planning 17(5): 243–251. Sep.-Oct. 1986.
251. MINORITY RIGHTS GROUP (MRG). Female circumcision, excision and infibulation. London, MRG, Jul. 1985. (Report No. 47) 21 p. (Mimeo)
252. MOERMAN, M.L. Growth of the birth canal in adolescent girls. American Journal of Obstetrics and Gynecology 143(5): 528–532. Jul. 1, 1982.
253. MOLA, G., ed. Manual of standard managements in obstetrics and gynaecology for doctors, H.E.O.s and nurses in Papua New Guinea. [Port Moresby], Papua New Guinea, Department of Health, 1986. 89 p.
254. MOLA, G. and AITKEN, I. Maternal mortality in Papua New Guinea 1976–1983. Papua New Guinea Medical Journal 27(2): 65–71. Jun. 1984.
255. MOLLER, B.R., AHRONS, S., LAURIN, J., and MÅRDH, P.-A. Pelvic infection after elective abortion associated with *Chlamydia trachomatis*. Obstetrics and Gynecology 59(2): 210–213. Feb. 1982.
256. MONREAL, T. Determinant factors affecting illegal abortion trends in Chile. In: Holtrop, H.R., Waife, R.S., Bustamente, W., and Rizo, A., eds. New developments in fertility regulation. (A conference for Latin American physicians, Airlie House, Airlie, Virginia, Mar. 28–30, 1976) Chestnut Hill, Massachusetts, Pathfinder Fund, 1976. p. 123–132.
257. MONTEITH, R.S., WARREN, C.W., STANZIOLA, E., URZUA, R.L., and OBERLE, M.W. Use of maternal and child health services and immunization coverage in Panama and Guatemala. PAHO Bulletin 21(1): 1–15. 1987.
258. MOODLEY, J., NAICKER, R.S., and MANKOWITZ, E. Eclampsia—a method of management: a preliminary report. South African Medical Journal 63(14): 530–535. 1983.
259. MOORE, S. (Institute for Resource Development/Westinghouse) [Demographic and health surveys] Personal communication, Jun. 3, 1988.
260. MOROCCO. MINISTERE DE LA SANTE PUBLIQUE (MOH) and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Enquête Nationale sur la Planification Familiale, la Fecondite et la Santé de la Population au Maroc (ENPS) 1987: rapport préliminaire. Rev. [National Survey of Family Planning, Fertility and Health of the Population of Morocco 1987: preliminary report. Rev.][FRE] [Rabbat, Morocco and Columbia, Maryland]. MOH and IRD, Feb. 1988. 20 p.
261. MOUTQUIN, J.-M., GAGNON, R., RAINVILLE, C., GIROUX, L., AMYOT, G., BILODEAU, R., and RAYNAULD, P. Maternal and neonatal outcome in pregnancies with no risk factors. Canadian Medical Association Journal 137(8): 728–732. Oct. 15, 1987.
262. MOXEY, L. Local supervision for local midwives. In: Fayad, M.M., Abdalla, M.I., Ibrahim, I.I., and Bayad, M.A., eds. Medical education in the field of primary maternal child health care. [Cairo], Egyptian Ministry of Health et al., 1984. p. 255–267.
263. MTIMAVALYE, L.A. and BELSEY, M.A. Infertility and sexually transmitted disease: major problems in maternal and child health and family planning. Presented at International Conference on Better Health for Women and Children through Family Planning, Nairobi, Oct. 5–9, 1987. 25 p.
264. MURPHY, M. Social consequences of vesico-vaginal fistula in northern Nigeria. Journal of Biosocial Science 13(2): 139–150. Apr. 1981.
265. MURTHY, N. Reluctant patients—the women of India. World Health Forum 3(3): 315–316. 1982.
266. MUSTAFA, A.Z. and RUSHWAN, H.M.E. Acquired genitourinary fistulae in the Sudan. Journal of Obstetrics and Gynaecology 78(10): 1039–1043. Nov. 1971.
267. MUTAMBIRWA, J. Pregnancy, childbirth, mother and child care among the indigenous people of Zimbabwe. International Journal of Gynaecology and Obstetrics 23(4): 275–285. 1985.
268. NASAH, B.T., NGUEMATCHA, R., EYONG, M., and GODWIN, S. Gonorrhea, *Trichomonas* and *Candida* among gravid and nongravid women in Cameroon. International Journal of Gynaecology and Obstetrics 18(1): 48–52. 1980.
269. NDIAYE, S., SARR, I., and AYAD, M. Senegal: Enquete Demographique et de Sante au Senegal 1986. [Senegal Demographic and Health Survey 1986.][FRE] Dakar, Senegal and Columbia, Maryland, Senegal Ministry of Economics and Finance and Institute for Resource Development/Westinghouse, Mar. 1988. 173 p.
270. NEUTRA, R. A case-control study for estimating the risk of eclampsia in Cali, Colombia. American Journal of Obstetrics and Gynecology 117(7): 894–903. Dec. 1, 1973.
271. NEW INTERNATIONALIST PUBLICATIONS. The state of the world's women 1985. Oxford, United Nations, 1985. 19 p.
272. NEWTON, N. Technologies for pregnancy care. Health Technology Directions 4(1): 1–12. First quarter 1984.
273. NEWTON, N. Technologies for safe births. Health Technology Directions 4(2): 1–16. Second quarter 1984.
274. N'GALY, B. Epidemiology of HIV infection in Africa. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 106.
275. NSANZE, H., WAIGWA, S.R., MIRZA, N., PLUMMER, F., ROELANTS, P., and PIOT, P. Chlamydial infections in selected populations in Kenya. In: Mårdh, P.-A., Holmes, K.K., Oriel, J.D., Piot, P., and Schachter, J., eds. Chlamydial infections. New York, Elsevier Biomedical Press, 1982. p. 421–424.
276. NTABA, H.M., LIOMBA, G.N., SCHMIDT, H.J., SCHONHALS, C., GURTLER, L., and DEINHARDT, F. HIV-1 prevalence in hospital patients and pregnant women in Malawi. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 323.
277. O'BYRNE, M. Consultant report and modules on care of women during pregnancy and care of women and newborns during labor and immediately after delivery. Washington, D.C., US Agency for International Development and American Public Health Association, 1984. 77 p.
278. O'CONNOR, P.W. Managing health systems in develop-

ing areas. Lexington, Massachusetts, Lexington Books, 1980. 314 p.
279. OJO, O.A. and SAVAGE, V.Y. A ten-year review of maternal mortality rates in the University College Hospital, Ibadan, Nigeria. American Journal of Obstetrics and Gynecology 118(4): 517–522. Feb. 15, 1974.
280. OJO, V.A., ADETORO, O.O., and OKWEREKWU, F.E.O. Characteristics of maternal deaths following cesarean section in a developing country. [1988]. 15 p. (To be published in International Journal of Obstetrics and Gynaecology)
281. OMRAN, A.R. Interrelations between maternal and neonatal health and family planning: conceptualization of the theme. In: Del Mundo, F., Ines-Cuyegkeng, E., and Aviado, D.M., eds. Primary maternal and neonatal health: a global concern. New York, Plenum Press, 1983. p. 23–42.
282. OMRAN, A.R. and STANDLEY, C.C., eds. Family formation patterns and health—further studies: an international collaborative study in Colombia, Egypt, Pakistan, and the Syrian Arab Republic. Geneva, World Health Organization, 1981. 464 p.
283. OMRAN, A.R., STANDLEY, C.C., AZAR, I.F., BERTAN, M., GUZMAN, V., NAHAPETIAN, V., and PISHAROTI, K.A. Family formation patterns and health. Geneva, World Health Organization, 1976. 562 p.
284. ORONSAYE, A.U. and ODIASE, G.I. Incidence of ectopic pregnancy in Benin City, Nigeria. Tropical Doctor 11(4): 160–163. Oct. 1981.
285. OSBORN, R.W. The nature of community-based distribution: some field results and problems. In: Wawer, M., Huffman, S., Cebula, D., and Osborn, R., eds. Health and family planning in community-based distribution programs. Boulder, Colorado, Westview Press, 1985. p. 21–24.
286. OSSER, S. and PERSSON, K. Postabortal pelvic infection associated with *Chlamydia trachomatis* and the influence of humoral immunity. American Journal of Obstetrics and Gynecology 150(6): 699–703. Nov. 15, 1984.
287. OYEBOLA, D.D.O. Traditional medicine and its practitioners among the Yoruba of Nigeria: a classification. Social Science and Medicine 14A(1): 23–29. Jan. 1980.
288. PEDERSEN, B. Country report—Sierra Leone. [Trip report, Washington, D.C., US Agency for International Development.] 1986. 34 p.
289. PERU. INSTITUTO NACIONAL DE ESTADISTICA (INE) and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Demografica y de salud Familiar (endes 1986): informe general. [Peru Demographic and Health Survey (1986): general report.] [SPA] Lima, Peru and Columbia, Maryland, NIS and IRD, Apr. 1988. 122 p.
290. PERU. INSTITUTO NACIONAL DE ESTADISTICA (INE) and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Demografica y de salud Familiar (endes 1986): resultados preliminares. [Peru Demographic and Health Survey (1986): preliminary results.] [SPA] Lima, Peru and Columbia, Maryland, NIS and IRD, Mar. 1987. 28 p.
291. PHILIPPINES. MINISTRY OF HEALTH (MOH). BUREAU OF HEALTH SERVICES. Pilot teaching guide. Manila, MOH, 1984. 122 p.
292. PHILLIPS, D.I., LUSTY, T.D., OSMOND, C., and CHURCH, D. Iodine supplementation: comparison of oral or intramuscular iodized oil with oral potassium iodide: a controlled trial in Zaire. International Journal of Epidemiology 17(1): 142–147. Mar. 1988.
293. PHILLIPS, J.F., SIMMONS, R., SIMMONS, G.B., and YUNUS, M. Transferring health and family planning service innovations to the public sector: an experiment in organization development in Bangladesh. Studies in Family Planning 15(2): 62–72. Mar.-Apr. 1984.
294. PHILPOTT, R.H. The recognition of cephalopelvic disproportion. Clinics in Obstetrics and Gynaecology 9(3): 609–624. Dec. 1982.
295. PHUAPRADIT, W., SIRIVONGS, B., and CHATURACHINDA, K. Maternal mortality in Ramathibodi Hospital: a 14-year review. Journal of the Medical Association in Thailand 68(12): Dec. 1985.
* 296. PILLSBURY, B. and BROWNLEE, A. Household and community beliefs and practices that influence maternal health and nutrition. [Draft] Washington, D.C., International Center for Research on Women, Jul. 1988. 112 p.
297. PILLSBURY, B.L.K. "Doing the month": confinement and convalescence of Chinese women after childbirth. In: Baasher, T., Bannerman, R.H.O., Rushwan, H., and Sharaf, I., eds. Traditional practices affecting the health of women and children. (WHO EMRO Technical Publication No. 2, Vol. 2) Alexandria, Egypt, World Health Organization, 1982. p. 21–32.
298. PLUMMER, F.A., LAGA, M., BRUNHAM, R.C., PIOT, P., RONALD, A.R., BHULLAR, V., MATI, J.Y., NDINYA-ACHOLA, J.O., CHEANG, M., and NSANZE, H. Postpartum upper genital tract infections in Nairobi, Kenya: epidemiology, etiology, and risk factors. Journal of Infectious Diseases 156(1): 92–98. Jul. 1987.
299. POPKIN, B. (University of North Carolina at Chapel Hill, Carolina Population Center) [Health effects of spacing] Personal communication, Jul. 25, 1988.
300. POPULATION CRISIS COMMITTEE (PCC). Access to birth control: a world assessment. Washington, D.C., PCC, Oct. 1987. (Population Briefing Paper No. 19) 8 p.
* 301. POPULATION CRISIS COMMITTEE (PCC). Country rankings of the status of women: poor, powerless and pregnant. Washington, D.C., PCC, Jun. 1988. (Population Briefing Paper No. 20) 10 p.
302. POTTER, J.E. Use of maternal health services in rural Mexico. Aug. 1985. 17 p. (Unpublished)
303. PRATINIDHI, A.K., SHROTRI, A.N., SHAH, U., and CHAVAN, H.H. Birth attendants and perinatal mortality. World Health Forum 6(2): 115–117. 1985.
* 304. PRICE, T.G. Preliminary report on maternal deaths in the Southern Highlands of Tanzania in 1983. Journal of Obstetrics and Gynecology of Eastern and Central Africa 3(3): 103–110. Sep. 1984.
305. PRITCHARD, J.A. and MACDONALD, P.C. Hypertensive disorders in pregnancy. In: Williams obstetrics. 16th ed. New York, Appleton-Century-Crofts, 1980. p. 665–700.
306. QURESHI, S.H. Performance evaluation of trained traditional birth attendants (TBAs): (Apr. 16–28, 1986) focus on their knowledge, attitudes and practices. Islamabad, Pakistan, United Nations Children's Fund, Aug. 1986. 51 p.
307. RAHMAN, M., CHEN, L.C., CHAKRABORTY, J., YUNUS, M., FARUQUE, A.S.G., and CHOWDHURY, A.I. Factors related to acceptance of tetanus toxoid immunization among pregnant women in a maternal-child health programme in rural Bangladesh. Dacca, Bangladesh, International Centre for Diarrhoeal Disease Research, Jan. 1981. (Scientific Report No. 43) 26 p.
308. RAHMAN, S. The effect of traditional birth attendants and tetanus toxoid in reduction of neo-natal mortality. Journal of Tropical Pediatrics 28(4): 163–165. Aug. 1982.
309. RALEIGH, V.S. Comprehensive health and development project at Pachod. New Delhi, Ford Foundation, 1987. (Anubhav Publication No. 4) 32 p.
310. RANSOME-KUTI, O. The effect of parity, birth intervals and maternal age on the health of the child. In: Del Mundo, F., Ines-Cuyegkeng, E., and Aviado, D.M., eds. Primary maternal and neonatal health: a global concern. New York, Plenum Press, 1983. p. 53–61.
311. RAO, A.B. Maternal mortality in India: a review. Geneva, World Health Organization, 1985. 16 p.
312. RAY, S.K., MUKHOPADHYAY, B.B., DAS, R., GANGULY, M.M., MANDAL, A., and ROY, S.C. Extent of utilisation of maternal care services of P.H.C. by the families of a rural area. Indian Journal of Public Health 31(2): 122–127. Jul.-Sep. 1984.
313. REDMAN, C.W.G. Eclampsia still kills. British Medical Journal 296(6631): 1209–1210. Apr. 30, 1988.
314. REHAN, N. and SANI, S. Eclampsia in Hausa women. Journal of Obstetrics and Gynaecology of Eastern and Central Africa 1(4): 152–155. Dec. 1982.
315. REICH, J. The International Conference on Better Health for Women and Children through Family Planning. International Family Planning Perspectives 13(3): 86–89. Sep. 1987.
316. REYES, P., JINADU, M.O., and DELANO, G.E. A study of the performance of the Oyo State community-based health/family planning workers. In: Proceedings: conference on the Oyo State CBD project: community-based delivery of health and family planning services, Ibadan, Nigeria, Jan. 14–16, 1985. New York, Columbia University, Center for Population and Family Health, May 1985. p. 151–167.
317. RINEHART, W., BLACKBURN, R., and MOORE, S.H. Employment-based family planning programs. Population Reports, Series J, No. 34. Baltimore, Johns Hopkins University, Population Information Program, Sep.-Oct. 1987. 32 p.
* 318. RINEHART, W., KOLS, A., and MOORE, S.H. Healthier mothers and children through family planning. Population Reports, Series J, No. 27. Baltimore, Johns Hopkins University, Population Information Program, May-Jun. 1984. 40 p.
319. ROBSON, P. An assessment of selected PHC activities MCH-Dukun services component. [New York], United Nations Children's Fund, 1980. 20 p.
* 320. ROCHAT, R.W. The magnitude of maternal mortality: definitions and methods of measurement. Presented at the Christopher Tietze International Symposium on the Prevention and Treatment of Contraceptive Failure, Berlin, Sep. 21–22, 1985. 24 p.
* 321. ROCHAT, R.W., JABEEN, S., ROSENBERG, M.J., MEASHAM, A.R., KHAN, A.R., OBAIDULLAH, M., and GOULD, P. Maternal and abortion related deaths in Bangladesh, 1978–1979. International Journal of Gynaecology and Obstetrics 19(2): 155–164. Apr. 1981.
* 322. RODRIGUEZ, J., QUINTERO, C., BERGONZOLI, G., and SALAZAR, A. Avoidable mortality and maternal mortality in Cali, Colombia. Geneva, World Health Organization, Nov. 1985. (FHE/PMM/85.9.1) 11 p.
323. ROOKS, J. (Consultant, Center for Population and Family Health, Columbia University) [Delivery kits in Nepal: emergency transportation in Somalia] Personal communication, Aug. 24, 1988.
* 324. ROSENFIELD, A. and MAINE, D. Maternal mortality—a neglected tragedy. Where is the M in MCH? Lancet 2(8446): 83–85. Jul. 13, 1985.
325. ROSS, D.A. Does training TBAs prevent neonatal tetanus? Health Policy and Planning 1(2): 89–98. 1986.
326. ROSS, S.M. Sexually transmitted diseases in pregnancy. Clinics in Obstetrics and Gynaecology 9(3): 565–592. Dec. 1982.
327. ROSSITER, C.E., HARRISON, K.A., and CHONG, H. Zaria maternity survey—1976–1979: 6. Relationships between maternal height, fetal birthweight and cephalopelvic disproportion suggest that young Nigerian primigravidae grow during pregnancy. 1984. 16 p. (Unpublished)
328. ROYSTON, E. The prevalence of nutritional anaemia in women in developing countries: a critical review of available information. World Health Statistics Quarterly 35(2): 52–91. 1982.
* 329. ROYSTON, E. and ARMSTRONG, S. Preventing maternal deaths. Geneva, World Health Organization, [1988]. (In Press)
* 330. ROYSTON, E. and LOPEZ, A.D. On the assessment of maternal mortality. World Health Statistics Quarterly 40: 214–224. 1987.
331. RUFFING, K.L. and SMITH, H.L. Maternal and child health care in Ecuador: obstacles and solutions. Health Care for Women International 5(4): 195–210. 1984.
332. RUSHWAN, H. Female circumcision: a reproductive health problem. In: Mati, J.K.G., Ladipo, O.A., Burkman, R.T., Magarick, R.H., and Huber, D., eds. Reproductive health in Africa. Baltimore, JHPIEGO, 1984. p. 178–180.
333. SADIK, N. Family planning strategies for the '80s. In: Del Mundo, F., Ines-Cuyegkeng, E., and Aviado, D.M., eds. Primary maternal and neonatal health: a global concern. New York, Plenum Press, 1983. p. 23–42.
334. SAI, F.T. Family planning and maternal health care: a common goal. World Health Forum 7(4): 315–339. 1986.
335. SAI, F.T. The safe motherhood initiative: a call for action. IPPF Medical Bulletin 21(3): 1–2. Jun. 1987.
336. ST. GEORGE, J. The obstetric flying squad: a method of reducing maternal mortality and morbidity in developing countries. Tropical Doctor 5(3): 110–115. Jul. 1975.
337. SALLEH, N.M., ANN, T.B., and ARSHAT, H. Some aspects of maternal care in rural peninsular Malaysia. Malyasian Journal of Reproductive Health 4(1): 20–28. Jun. 1986.
* 338. SANGARET, M. and DIARRA, S. Obstetric care surveillance in Abidjan. Research Triangle Park, North Carolina, Family Health International, Jul. 1987. 183 p.
339. SCHERJON, S. A comparison between the organization of obstetrics in Denmark and The Netherlands. British Journal of Obstetrics and Gynaecology 93: 684–689. Jul. 1986.
340. SCHULZ, K.F., CATES, W., Jr., and O'MARA, P.R. A synopsis of the problems in Africa of syphilis and gonorrhoeae during pregnancy. African Journal of Sexually Transmitted Diseases 2(2): 56–74. Oct. 1986.
341. SCHWARTZ, J.B., AKIN, J.S., and POPKIN, B.M. Price and income elasticities of demand for modern health care: the case of infant delivery in the Philippines. World Bank Economic Review 2(1): 49–76. 1988.
342. SEGAMBA, L., NDIKUMASABO, V., TOMASSI, F. DE, and MAKINSON, C. Enquête demographique et de santé au Burundi 1987: rapport preliminaire. [Burundi Demographic and Health Survey 1987: preliminary report.] [FRE] Ministry of the Interior, Department of Population, and Institute for Resource Development, [Bujumbura, Burundi, and Columbia, Maryland], 1987. 46 p.
343. SENDE, P., ABONG, T., and GARRIGUE, G.P. *Chlamydia trachomatis*: étude de la prévalence chez la femme enceinte, la femme infécondé, et l'homme souffrant d'une urétrite chronique. [*Chlamydia trachomatis*: a prevalence study among pregnant and infertile female patients and among men suffering from a subacute urethritis.] [FRE, abstract in ENG] African Journal of Sexually Transmitted Diseases 2(2): 72–74. Oct. 1986.
344. SHAH, K.P. Organisation of maternity services in India. In: Philpott, R.H., ed. Maternity services in the developing world—what the community needs. London, Royal College of Obstetricians and Gynaecologists, 1980. p. 143–152.
345. SHAH, U., PRATINIDHI, A.K., BHATLAWANDE, P.V., and ALEKAR, S.V. Using community health workers to screen for anaemia. World Health Forum 5(1): 35–36. 1984.
346. SHERRIS, J.D., BLACKBURN, R., MOORE, S.H., and MEHTA, S. Immunizing the world's children. Population Reports, Series L, No. 5, Baltimore, Johns Hopkins University, Population Information Program, Mar.-Apr. 1986. 40 p.
347. SHERRIS, J.D. and FOX, G. Infertility and sexually transmitted disease: a public health challenge. Population Reports, Series L, No. 4. Baltimore, Johns Hopkins University, Population Information Program, Jul. 1983. 40 p.
348. SHERRIS, J.D., RAVENHOLT, R.B., BLACKBURN, R., GREENBERG, R.H., KAK, N., PORTER, R.W., 3rd, and SAUNDERS, S. Contraceptive social marketing: lessons from experience. Population Reports, Series J, No. 30. Baltimore, Johns Hopkins University, Population Information Program, Jul.-Aug. 1985. 40 p.
349. SIBAI, B.M., MCCUBBIN, J.H., ANDERSON, G.D., LIPSHITZ, J., and DILTS, P.V., Jr. Eclampsia: 1. Observations from 67 recent cases. Obstetrics and Gynecology 58(5): 609–613. Nov. 1981.
350. SIMPSON-HEBERT, M., PIOTROW, P.T., CHRISTIE, L.E., and STREICH, J. Traditional midwives and family planning. Population Reports, Series J, No. 22. Baltimore, Johns Hopkins University, Population Information Program, May 1980. 54 p.
351. SIVARD, R.L. Women: a world survey. Washington, D.C., World Priorities, 1985. 44 p.
352. SOKAL, D.C., SAVADOGO, L., and ADJIBADE, A. Definition of high risk pregnancy in Burkina Faso, West Africa. Presented at American Public Health Association Annual Meeting, New Orleans, Louisiana, Oct. 18–22, 1987. 14 p.
353. SOWMINI, C.N. Community education in sexually transmitted diseases: an experimental study. Asian Journal of Infectious Diseases 1(1–2): 52–54. Jun.-Sep. 1977.
354. SRI LANKA. MINISTRY OF PLAN IMPLEMENTATION, DEPARTMENT OF CENSUS AND STATISTICS (DCS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD/W). Sri Lanka Demographic and Health Survey 1987. [Colombo], Sri Lanka, and [Columbia, Maryland], DCS and IRD/W, Jul. 1987. 22 p.
* 355. STARRS, A. Preventing the tragedy of maternal deaths: a report on the International Safe Motherhood Conference, Nairobi, World Bank, World Health Organization, United Nations Fund for Population Activities, Feb. 1987. 56 p.
356. STEKETEE, R.W. and BREMAN, J.G. Malaria infection in pregnant women in Zaire: the effects and the potential for intervention. Annals of Tropical Medicine and Parasitology 82(2): 113–120. 1988.
357. STINSON, W., SAIDI, R., CEBULA, D., CARP, C., and REINHOLD, M. Women and health. Geneva, World Federation of Public Health Associations, Mar. 1986. 80 p.
358. STUDD, J. Partograms and nomograms of cervical dilation

in management of primigravid labour. British Medical Journal 4(5890): 451–455. Nov. 24, 1973.
359. SUJPLUEM, C., KANCHANASINITH, K., and NARKAVONAKIT, T. Thailand: utilization of TBAs in family planning and maternal and child care. in: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. (Public Health Papers No. 75) p. 167–204.
360. TAHZIB, F. Epidemiological determinants of vesico-vaginal fistulas. British Journal of Obstetrics and Gynaecology 90(6): 387–391. May 1983.
361. TAHZIB, F. and DANIEL, S.O. Traditional medicine and the modern medical curriculum. Lancet 2(8500): 203–204. Jul. 26, 1986.
362. TAMBYRAJA, R.L. and RATNAM, S.S. The small fetus: growth-retarded and preterm. Clinics in Obstetrics and Gynaecology 9(3): 517–537. Dec. 1982.
363. TERRAGNA, A., DE MARIA, A., SAMPIETRO, F., FERRAZIN, A., LOY, A., PANTAROTTO, F., and GOTTA, C. Perinatal HIV infection: evaluation of the risk for the mother and child. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 266.
364. TOM, A.R. El and LAURO, D. Phasing the introduction of MCH/FP services: the Sudan Community Based Family Health Project. 1984. 26 p. (Unpublished)
365. TOM, A.R. El, MUBARAK, N., WESLEY, S., MATTHEWS, M.H., and LAURO, D. Developing the skills of illiterate health workers. World Health Forum 5(30): 216–220. 1984.
366. TONTISIRIN, K., BOORANASUBKAJORN, U., HONGSUMARN, A., and THEWTONG, D. Formulation and evaluation of supplementary foods for Thai pregnant women. American Journal of Clinical Nutrition 43(6): 931–939. Jun. 1986.
367. TSEGA, E. Current views on liver diseases in Ethiopia. Ethiopian Medical Journal 15(2): 75–82. Apr. 1977.
368. TWUMASI, P.A. Traditional birth attendant review programme in Ghana. [Accra], Ghana, Ministry of Health, Oct. 1987. 159 p.
369. UNITED NATIONS CHILDREN'S FUND (UNICEF) Review and analysis of Daya training programme in Egypt. [New York], UNICEF, Aug. 1985. 198 p.
370. UNITED NATIONS CHILDREN'S FUND. The state of the world's children 1988. Oxford, Oxford University Press, 1988. 86 p.
371. UNITED NATIONS CHILDREN'S FUND (UNICEF) and WORLD HEALTH ORGANIZATION (WHO). Facts for life. [New York and Geneva], UNICEF and WHO, [1988]. 85 p.
372. UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (US AID). CAIRO HEALTH OFFICE. Egypt Child Survival Project paper. [Internal document]. Washington, D.C., US AID, Jul. 1985. p. 31–40.
373. UNITED STATES. CENTERS FOR DISEASE CONTROL. Enterically transmitted non-A, non-B hepatitis—East Africa. Morbidity and Mortality Weekly Report 36(16): 241–244. May 1, 1987.
374. UNITED STATES. CENTERS FOR DISEASE CONTROL (CDC). Family planning methods and practice: Africa. Atlanta, Georgia, CDC, 1983. 329 p.
375. VAN TEIJLINGEN, E. and MCCAFFERY, P. The profession of midwife in the Netherlands. Midwifery 3(4): 178–186. Dec. 1987.
376. VERDERESE, M. DE L. and TURNBULL, L.M. The traditional birth attendant in maternal and child health and family planning. Geneva, World Health Organization, 1975. 111 p.
377. VERZIN, J.A. Sequelae of female circumcision. Tropical Doctor, Oct. 1975. p. 163–169.
378. VIEGAS, O.A.C., COLE, T.J., and WHARTON, B.A. Impaired fat deposition in pregnancy: an indicator for nutritional intervention. American Journal of Nutrition 45(1): 23–28. Jan. 1987.
379. VILLAR, J., ALTOBELLI, L., KESTLER, E., and BELIZÁN, J. A health priority for developing countries: the prevention of chronic fetal malnutrition. Bulletin of the World Health Organization 64(6): 847–851. Dec. 1986.
380. VILLAR, J. and BELIZAN, J.M. The relative contribution of prematurity and fetal growth retardation to low birth weight in developing and developed societies. American Journal of Obstetrics and Gynecology 143(7): 793–798. Aug. 1, 1982.
381. VILLAR, J. and RIVERA, J. Nutritional supplementation during two consecutive pregnancies and the interim lactation period: effect on birth weight. Pediatrics 81(1): 51–57. Jan. 1988.
382. VOORHOEVE, A.M., KARS, C., and VAN GINNEKEN, J.K. Modern and traditional antenatal and delivery care. In: Van Ginneken, J.K. and Muller, A.S., eds. Maternal and child health in rural Kenya: an epidemiological study. 1984. p. 309–322.
383. VOORHOEVE, A.M., MULLER, A.S., and W'OIGO, H. The outcome of pregnancy. In: Van Ginneken, J.K. and Muller, A.S. Maternal and child health in rural Kenya: an epidemiological study. London, Croom Helm, 1984. p. 223–269.
384. VOORHOEVE, A.M., MULLER, A.S., and W'OIGO, H. The outcome of pregnancy. Tropical and Geographical Medicine 31: 607–627. 1979.
385. WADHAWAN, S. and WACHA, D.S.O. A review of urinary fistulae in a university teaching hospital. International Journal of Gynaecology and Obstetrics 21: 381–385. 1983.
386. WAGER, G.P., MARTIN, D.H., KOUTSKY, L., ESCHENBACH, D.A., DALING, J.R., CHIANG, W.T., ALEXANDER, E.R., and HOLMES, K.K. Puerperal infectious morbidity: relationship to route of delivery and to antepartum *Chlamydia trachomatis* infection. American Journal of Obstetrics and Gynecology 138(7, Pt.2): 1028–1033. Dec. 1, 1980.
387. WALDRON, I. Patterns and causes of excess female mortality among children in developing countries. World Health Statistics Quarterly 40: 194–210. 1987.
* 388. WALKER, G.J.A., ASHLEY, D.E.C., MCCAW, A.M., and BERNARD, G.W. Maternal mortality in Jamaica. Lancet 1(8479): 486–488. Mar. 1, 1986.
389. WALLACE, G.G. Female circumcision. Presented at the annual convention of the American Medical Student Association, Mar. 26, 1988. 18 p.
390. WALSH, J.A. and WARREN, K.S. Selective primary health care: an interim strategy for disease control in developing countries. Social Science and Medicine 14C: 145–163. 1980.
391. WASUNNA, A. [World Health Organization Program on Clinical Technology]. [Surgery at small district hospitals by general practitioners]. Personal communication, Apr. 28, 1988.
392. WATSON, D.S. Use of "at risk" antenatal score card by aboriginal health workers in Arnhem Land. Tropical Doctor 14(3): 133–135. Jul. 1984.
393. WEST, K.M. Sierra Leone: practices of untrained TBAs and support for TBA training and utilization. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. (Public Health Papers No. 75) p. 71–96.
* 394. WESTON, L. Reducing maternal deaths in developing countries. [Washington, D.C.], World Bank, 1986. (PHN Technical Note 86-19) 108 p.
395. WHITE, S.M., THORPE, R.G., and MAINE, D. Emergency obstetric surgery performed by nurses in Zaire. Lancet 2(8559): 612–613. Sep. 12, 1987.
396. WILLIAMS, B. and YUMKELLA, F. The evaluation of traditional birth attendants training programme and performance in Sierra Leone. [Freetown], Sierra Leone, Ministry of Health, 1982. 29 p.
* 397. WILLIAMS, C.D., BAUMSLAG, N., and JELLIFFE, D.B. Mother and child health: delivering the services. 2nd ed. London, Oxford University Press, 1985. 316 p.
* 398. WINIKOFF, B. Women's health: an alternative perspective for choosing interventions. Studies in Family Planning 19(4): 197–214. Jul.–Aug. 1988.
* 399. WINIKOFF, B., CARIONAN, C., BERNARDIK, E., and SEMERARO, P. Medical services to save mothers' lives: feasible approaches to reducing maternal mortality. Dec. 1, 1986. 47 p. (Unpublished)
400. WINIKOFF, B. and CASTLE, M.A. The maternal depletion syndrome: clinical diagnosis or eco-demographic condition? New York, Population Council, Aug. 1987. 12 p.
401. WINIKOFF, B. and SULLIVAN, M. Assessing the role of family planning in reducing maternal mortality. Studies in Family Planning 18(3): 128–143. May–Jun. 1987.
402. WONG, E.L., POPKIN, B.M., GULKEY, D.R., and ABIN, J.S. Accessibility, quality of care and prenatal care use in the Philippines. Social Science and Medicine 24(11): 927–944. 1987.
403. WORLD BANK. Financing health services in developing countries: an agenda for reform. Washington, D.C., World Bank, 1987. 93 p.
404. WORLD BANK. World development report 1987. New York, Oxford University Press, 1987. 285 p.
405. WORLD HEALTH ORGANIZATION. Case histories. [Booklet from Safe Motherhood Conference, Nairobi, Feb. 10–13, 1987]. Geneva, World Health Organization, 1987. 4 p.
406. WORLD HEALTH ORGANIZATION (WHO). Constitution of the World Health Organization. In: Basic documents. 30th ed. Geneva, WHO, 1980. p. 1–18.
407. WORLD HEALTH ORGANIZATION (WHO). Coverage of maternity care: a tabulation of available information. Geneva, WHO, 1985. (FHE/85.1) 19 p.
408. WORLD HEALTH ORGANIZATION (WHO). Energy and protein requirements. Geneva, World Health Organization, 1985. (Technical Report Series 724) 206 p.
* 409. WORLD HEALTH ORGANIZATION (WHO). Essential obstetric functions at first referral level. Geneva, WHO, 1986. (FHE/86.4) 41 p.
410. WORLD HEALTH ORGANIZATION. The extension of health service coverage with traditional birth attendants: a decade of progress. WHO Chronicle 36(3): 92–96. 1982.
411. WORLD HEALTH ORGANIZATION (WHO). Female circumcision: statement of WHO position and activities. Geneva, WHO, Jun. 1982. 1 p. (Mimeo)
412. WORLD HEALTH ORGANIZATION. Geographic variation in the incidence of hypertension in pregnancy. American Journal of Obstetrics and Gynecology 158(1): 80–83. Jan. 1988.
413. WORLD HEALTH ORGANIZATION. Infections, pregnancies, and infertility: perspectives on prevention. Fertility and Sterility 47(6): 964–968. Jun. 1987.
414. WORLD HEALTH ORGANIZATION (WHO). Issues in neonatal tetanus control. Geneva, WHO, 1987. (EPI/GAG/87/WP.11) 20 p. (Mimeo)
415. WORLD HEALTH ORGANIZATION. Malaria chemoprophylaxis. Weekly Epidemiological Record 57(49): 381–384. December 10, 1982.
416. WORLD HEALTH ORGANIZATION. Maternal and child health (MCH): control of neonatal tetanus. Weekly Epidemiological Record 60(2): 5–12. Jan. 11, 1985.
* 417. WORLD HEALTH ORGANIZATION (WHO). Maternal mortality rates: a tabulation of available information. 2nd ed. Geneva, WHO, 1986. 46 p.
418. WORLD HEALTH ORGANIZATION (WHO). Maternal mortality: helping women off the road to death. WHO Chronicle 40(5): 175–183. 1986.
419. WORLD HEALTH ORGANIZATION (WHO). The partograph, section 1: and principle and strategy (WHO/MCH/88.3). 1988. 14 p. (Unpublished)
420. WORLD HEALTH ORGANIZATION (WHO). The partograph, section 2: a users' manual (WHO/MCH/88.4). 1988. 12 p. (Unpublished)
421. WORLD HEALTH ORGANIZATION (WHO). Prevention of maternal mortality. Geneva, WHO, 1986. (FHE/86.1) 23 p.
422. WORLD HEALTH ORGANIZATION (WHO). Prevention of neonatal tetanus through immunization. Geneva, WHO, 1986. (WHO/EPI/GEN/86.9 REV 1) 8 p.
423. WORLD HEALTH ORGANIZATION (WHO). Prototype home-based mother's record: a guideline for its use, and adaptation in maternal and child health/family planning programmes and a reference manual for field testing and evaluation. Geneva, WHO, 1985. (MCH/85.13) 119 p.
424. WORLD HEALTH ORGANIZATION (WHO). Safe motherhood initiative. Geneva, WHO, 1988. (FHE/SMI/MIP/88.2) 25 p. (Mimeo)
425. WORLD HEALTH ORGANIZATION (WHO). A simplified childbirth kit for primary health care: report of a Working Group meeting, Kalutara, Sri Lanka, 4 to 6 Nov. 1985. Geneva, WHO, 1986. (WHO/MCH/86.7) 10 p.
426. WORLD HEALTH ORGANIZATION (WHO). The status of women, maternal health and maternal mortality. Geneva, WHO, 1987. (FHE/SMC/87.3) 21 p. (To be published in WHO Monograph on Maternal Mortality)
427. WORLD HEALTH ORGANIZATION (WHO), and INTERNATIONAL CONFEDERATION OF MIDWIVES, and UNITED NATIONS CHILDREN'S FUND. Women's health and the midwife: a global perspective: report of a collaborative pre-congress workshop. Geneva, WHO, 1987. 29 p.
428. YANG, J. and PARK, C.B. Maternal and child health and family planning services. In: Use of rural health services: proceedings of the Regional Seminar on the Use of Rural Health Services, Jan. 20–25, 1986, Manila, Philippines. Manila, Asian Development Bank, 1986. p. 70–80.
429. YVERT, F., RIOU, J.Y., FROST, E., and IVANOFF, B. Les infections gonococciques au Gabon (Haut-Ogooue) [Gonococcal infections in Gabon (Haut-Ogooue)] [FRE] Pathologie Biologie 32(2): 80–84. Feb. 1984.
430. ZACARIAS, F. Can we really control STDs? World Health, p. 20–23. Nov. 1986.
431. ZHANG, L. and DING, H. Analysis of the causes of maternal death in China. Bulletin of the World Health Organization 66(3): 387–390. 1988.
432. ZIMICKI, S. The relationship between maternal mortality and fertility. Philadelphia, Population Studies Center, University of Pennsylvania, Mar. 8, 1988. 68 p.
433. ZOHOUN, I., BIGOT, A., SANKALE, J.-L., BIORKMAN, A., M'BOUP, S., and KANKI, P. Prevalence of HIV-1 and HIV-2 in Benin. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Jun. 12–16, 1988. p. 330.

ADDENDA

434. CHAYOVAN, N., KAMNUANSILPA, P., and KNODEL, J. Thailand Demographic and Health Survey, 1987. Bangkok and Columbia, Maryland, Chulalongkorn University and Institute for Resource Development/Westinghouse, May 1988. 217 p.
435. MEGAFU, U. Factors influencing maternal survival in ruptured uterus. International Journal of Gynaecology and Obstetrics 23(6): 441–530. Dec. 1985.
436. MUÑOZ GONZÁLEZ, L.A., NAÑEZ BURBANO, H., BECERRA CORREDOR, E., and KLEVENS, J. Mortalidad materna instituto Materno Infantil 1976–1980. [Maternal mortality at the Maternal and Infant Institute 1976–1980] [SPA] Revista Colombiana de Obstetricia y Ginecologia 36(4): 227–243. Jul.–Aug. 1985.
437. NDIKUYEZE, A., KLION, A., VERNON, A., TAYLOR, E., ODAKA, N., SAAH, A., and POLK, B.F. Vertical transmission of HIV-1 from mothers to infants in Rwanda. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, June 12–16, 1988. p. 345.
438. PEDERSEN, B. Trip report, Benue State, Nigeria, May 31–June 19, 1987. Washington, D.C., American College of Nurse-Midwives, 1987. 8 p.
439. PEDERSEN, B. Trip report, Tanzania, February–March 1984. Washington, D.C., American College of Nurse-Midwives, 1984. 41 p.
440. SRI LANKA. DEPARTMENT OF CENSUS AND STATISTICS [SLDCS], MINISTRY OF PLAN IMPLEMENTATION, and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE [IRD/W]. Sri Lanka Demographic and Health Survey 1987. Colombo, Sri Lanka and Columbia, Maryland, SLDCS and IRD/W, May 1988. p. 100.

ISSN 0887-0241

POPULATION REPORTS IN PRINT

ORAL CONTRACEPTIVES—Series A
___ A-6 Oral Contraceptives in the 1980s [1982] *(A,P,S)*

INTRAUTERINE DEVICES—Series B
___ B-5 IUDs—A New Look [1988]

STERILIZATION, FEMALE—Series C
___ C-9 Minilaparotomy and Laparoscopy: Safe, Effective, and Widely Used [1985] *(F,P,S)*

STERILIZATION, MALE—Series D
___ D-4 Vasectomy—Safe and Simple [1983] *(F,P,S)*

LAW AND POLICY—Series E
___ E-6 Legal Trends and Issues in Voluntary Sterilization [1981] *(F,P,S)*
___ E-7 Laws and Policies Affecting Fertility: A Decade of Change [1984] *(A,F,P,S)*

BARRIER METHODS—Series H
___ H-7 New Developments in Vaginal Contraception [1984] *(A,F,P,S)*

FAMILY PLANNING PROGRAMS—Series J
___ J-22 Traditional Midwives and Family Planning [1980] *(F,P)*
___ J-23 Films for Family Planning Programs [1981] *(F,P,S)*
___ J-24 Breast-Feeding, Fertility, and Family Planning [1984] *(A,F,P)*
___ J-25 Population and Birth Planning in the People's Republic of China [1982] *(F,P,S)*
___ J-26 Sources of Population and Family Planning Assistance [1983] *(F, P, S)*
___ J-27 Healthier Mothers and Children Through Family Planning [1984] *(A,F,P,S)*
___ J-28 After Contraception: Dispelling Rumors About Later Childbearing [1984] *(A,F,P,S)*
___ J-29 The Impact of Family Planning Programs on Fertility [1985] *(F, P, S)*
___ J-30 Contraceptive Social Marketing: Lessons from Experience [1985] *(F,P,S)*
___ J-31 Operations Research: Lessons for Policy and Programs [1986] *(F,P,S)*
___ J-32 Radio—Spreading the Word on Family Planning [1986] *(F,P,S)*
___ J-33 Men: New Focus for Family Planning Programs [1986] *(F,P,S)*
___ J-34 Employment-Based Family Planning Programs [1987] *(F,P,S)*
___ J-35 Counseling Makes a Difference [1987] *(F)*
___ J-36 Counseling Guide [1987] *(F)*

INJECTABLES AND IMPLANTS—Series K
___ K-2 Long-Acting Progestins—Promise and Prospects [1983] *(F,P,S)*
___ K-3 Hormonal Contraception: New Long-Acting Methods [1987] *(F,P,S)*

ISSUES IN WORLD HEALTH—Series L
___ L-2 Oral Rehydration Therapy for Childhood Diarrhea [1984] *(A,F,P,S)*
___ L-3 Community-Based Health and Family Planning [1982] *(F,P,S)*
___ L-4 Infertility and Sexually Transmitted Disease: A Public Health Challenge [1983] *(F,P,S)*
___ L-5 Immunizing the World's Children [1986] *(F,S)*
___ L-6 AIDS: A Public Health Crisis [1986] *(F,P,S)*
___ L-7 Mothers' Lives Matter: Maternal Health in the Community [1988]

SPECIAL TOPICS—Series M
___ M-7 Migration, Population Growth, and Development [1983] *(F,P,S)*
___ M-8 Fertility and Family Planning Surveys: An Update [1985] *(F,P,S)*
___ M-9 Youth in the 1980s: Social and Health Concerns [1985] *(F,P,S)*

Population Information Program, The Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202, USA

1. **Population Reports** in print in English are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $2.00 each; full set of reports in print, $35.00; with binder, $40.00 Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ❑, English ❑, French ❑, Portuguese ❑, Spanish ❑
3. Please type or print your name and mailing address clearly:

Family Name _____ Given name _____
Organization _____
Address _____
City _____ Postal code _____
Country _____

4. ❑ Send _____ copies of each future issue of **Population Reports.**
   ❑ I am already on the **Population Reports** mailing list.
   ❑ Please send me a binder (in developed countries, $7.00 for binder only)
   ❑ I do not want to receive **Population Reports** regularly.
5. Mail this form to address above.

POPLINE a computerized literature search service, offers bibliographic citations and abstracts on a specific subject or field of interest from a collection of more than 155,000 documents covering all aspects of family planning and population. **In developing countries** searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States** institutional or individual users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **In other developed countries** searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below; a fee may be charged for these requests.

POPLINE is produced by the Population Information Program at The Johns Hopkins University in collaboration with the Center for Population and Family Health at Columbia University, *Population Index* at Princeton University, and the Carolina Population Center at the University of North Carolina at Chapel Hill. POPLINE production is funded primarily by the United States Agency for International Development and by the National Institute of Child Health and Human Development. The CD-ROM version of POPLINE is funded by the United Nations Population Fund.

To request a search, please complete the following form:

Search topic _____
Purpose _____
Family Name _____ Given name _____ Organization _____
Address _____ City and postal code: _____ Country: _____

Mail this form to either of these addresses ☛
Services to developing countries free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
527 St. Paul Place
Baltimore, Maryland 21202, USA

Center for Population and Family Health
Library/Information Program
Columbia University
60 Haven Avenue
New York, New York 10032, USA

U2520-1.12 f

Population Reports

Lower-Dose Pills

HIGHLIGHTS

Over 60 million now using oral contraceptives ..... Page 6
Pill sales trends graphed for 37 areas around the world 8
Sales data show low-estrogen pills now most widely used ...9
Effective contraception is pill's biggest benefit 12
Is skipping low-dose pills more likely to mean pregnancy? ...12
Pill prevents two cancers 15
Minipill is best pill during breastfeeding 16
Limited evidence suggests less circulatory system disease risk with low-estrogen pills 17
No link established between the pill and AIDS 20
Conflicting findings on breast cancer in young women 21
Problems studying cervical cancer make conclusions difficult 24

CONTENTS

Background ..... Page 3
Moving to Lower Doses 4
Use 6
Benefits 12
Health Risks 17
Unresolved Health Questions .21
Bibliography 26

Published by the Population Information Program, Center for Communication Programs, The Johns Hopkins University, 527 St. Paul Place, Baltimore, MD 21202, USA.

Volume XVI, Number 3

Over 60 million women around the world are now using oral contraceptives. In most countries "the pill" has long been the most popular form of reversible contraception. Why? Because the pill offers a means of preventing pregnancies that is very effective, easy to use, and safe for most women.

In the 1980s pill use has been growing gradually. In developed countries use has reached about 24 million married women, or 14 percent of married women of reproductive age. In developing countries over 38 million married women now use the pill—about 6 percent of married women of reproductive age.

The most popular pill today is the low-dose estrogen-progestin pill. Low-dose pills contain one-quarter or less estrogen and substantially less progestin than the first pills. Defined as containing less than 50 micrograms of estrogen, low-dose pills now account for over 85 percent of pills sold in developed countries, almost 60 percent of pills sold in developing countries, and almost 80 percent of pills supplied by donor agencies. Low-dose pills are gaining ground both in the market and in family planning programs.

Why Low-Dose Pills?

Low-dose pills seem to cause fewer unpleasant side effects, such as nausea and dizziness. Low doses also are thought to minimize the chances of developing certain circulatory system diseases linked to the pill. Few studies have been able to compare pill doses, however.

With lower doses, taking pills correctly is probably more important. Skipping pills and other inconsistent use can lead to pregnancy, perhaps more often with low-dose pills. Skipping pills also increases breakthrough bleeding, a major reason that women stop using pills. Pill-taking mistakes appear to be common and may explain many unintended pregnancies. Family planning programs are now concentrating on helping women remember to take pills correctly, every day.

Benefits, Risks, and Uncertainties

Research over three decades has shown that the pill has noncontraceptive benefits and risks. It helps to prevent two major types of cancer, increases the risk of certain circulatory system diseases for some women, and has other effects as well. Some questions remain unresolved. In any case, little research on these issues has involved low-dose pills. This makes interpretation for today's pill users difficult.

The biggest benefit of the pill is its effectiveness. The pill has relieved millions of women around the world of the burden of unwanted pregnancies. But in addition, by preventing risky pregnancies, the pill has saved a great many women's lives and avoided children's deaths. Also, pill users have fewer cases of endometrial cancer (cancer of the lining of the uterus) and ovarian cancer than other women. The longer women use the pill, the more their protection against these cancers. The pill also helps to prevent anemia, ectopic pregnancy (pregnancy outside the uterus), painful menstruation, certain benign breast tumors, and ovarian cysts.

Although the pill increases the risk of thromboembolism, stroke, and heart attack, the risk has been seen mainly in older women who smoked cigarettes and used higher-dose pills. In countries with high maternal mortality rates, the risks of oral contraceptives are clearly much less than the risks of pregnancy and childbirth. In developed countries also, pill use is safer, except for older women who smoke.

Recent studies of breast cancer have produced confusing results. Concern is focused on women who took the pill while they were young or before having their first child. A plausible hypothesis now emerging is that the pill may accelerate breast cancer development for these women. It remains to be seen whether there is a corresponding decrease in cases at older ages. Nearly all studies, however, find no risk for a woman who starts using pills after she has already had a child. Recent cervical cancer studies seem to find a slightly greater risk for long-term pill users, but the difficulties of studying cervical cancer make conclusions uncertain.

While not every question about the pill is answered, there is no question about its unique and essential place in family planning. The pill remains the method that many young women want for spacing their pregnancies. And especially for these women it remains effective, safe, and convenient.

This issue of Population Reports was prepared by Chris Wharton and Richard Blackburn, M.S. Ward Rinehart, Editor. Design by Linda D. Sadler. Production by Merridy Gottlieb. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: Jane T. Bertrand, Louise Brinton, Laneta Dorflinger, Richard Edgren, Larry L. Ewing, Ronald H. Gray, David A. Grimes, Gary Grubb, John Guillebaud, Susan Harlap, Robert A. Hatcher, Susan E. Holck, Clifford Kay, Kathy Kennedy, Nancy C. Lee, Eiliv Lund, James McCarthy, Klim McPherson, Olaf Meirik, W. Henry Mosley, Håkan Olsson, Donna T. Pepe, M.C. Pike, Malcolm Potts, Jonas Ranstam, Thomas Rohan, Judith P. Rooks, Lynn Rosenberg, James J. Schlesselman, Pramilla Senanayake, Samuel Shapiro, James Shelton, David C.G. Skegg, J. Joseph Speidel, Bruce Stadel, David Thomas, Martin Vessey, and Edward E. Wallach. Some reviewers read portions of the manuscript; others, all.

Population Reports is published five times a year (March, May, September, November, December) at 527 St. Paul Place, Baltimore, Maryland 21202, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second-class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202, USA.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the United States Agency for International Development.

Population Information Program
Center for Communication Programs
The Johns Hopkins School of Hygiene and Public Health

Phyllis T. Piotrow, Ph.D., Director, **Center for Communication Programs** and **Population Information Program**

Ward Rinehart, Deputy Director, Population Information Program, and Editor, **Population Reports**

Anne W. Compton, Associate Director for POPLINE computerized bibliographic services

Patrick L. Coleman, Deputy Director, **Center for Communication Programs** and Project Director, **Population Communication Services**, developing family planning communication strategies and materials

Background

Over the nearly 30 years since oral contraceptives (OCs) were first marketed, they have symbolized modern contraception. While other family planning methods are also widely used, OCs have received more public attention. Publicity has focused on discoveries of some rare but serious side effects and persistent concerns about others. Equally if not more important, however, has been the relatively unpublicized story of the millions of women whose lives have been healthier, happier, and more secure—indeed, women whose lives were saved—because of the reliable, convenient contraception that OCs provide.

The idea of oral contraception with hormones dates back to the 1920s (176, 385). Not until the 1940s and 1950s, however, did inexpensive, orally effective hormones became available (113, 385). Then, after more than a decade of research, in 1960 the US Food and Drug Administration (US FDA) approved the first OC. This pill, G.D. Searle and Company's Enovid-10, contained 9.85 milligrams (mg) of the progestin hormone norethynodrel and 150 micrograms (µg) of the estrogen hormone mestranol. By 1970 an estimated 8 to 10 milion US women were using the pill, as were an equal number in other developed countries (396, 452).

OCs began to appear in developing countries in the mid-1960s, but high prices put them beyond the reach of all but a few women (395, 452). In 1967 international donor organizations, led by the US Agency for International Development (US AID) and the Swedish International Development Authority (SIDA), began to make OCs available to developing-country governments and international population agencies (378, 396). Family planning programs in the developing world then began to supply more women with OCs. By the early 1970s an estimated 20 to 30 million women in developing countries were using OCs (452).

OC use has continued to grow in the 1970s and 1980s. With more than 60 million users—38 million of them in developing countries—OCs trail only voluntary sterilization and IUDs in worldwide use.

■

OC Effectiveness and Effects

From the start there has been little doubt about the contraceptive effectiveness of combined progestin-estrogen pills. When used properly, they rank with injectables, the more recently developed hormonal implants, and the latest generation of IUDs as almost perfectly effective, reversible contraception (see pp. 12–13). Some pregnancies do occur, however, when women do not take their pills correctly.

OC use has noncontraceptive side effects, both good and bad, both minor and serious. Early clinical trials showed that some users experience headaches, nausea, cramps, irregular menstrual bleeding, breast tenderness, or weight gain. These side effects usually are temporary and, except for a certain type of headache, do not appear to be symptomatic of more serious problems. They are annoying, however, and lead some women to stop using pills.

In part because of their noncontraceptive effects, OCs have been scientifically scrutinized more intensively than any other medication in history. The first serious adverse effects reported were venous thromboembolism and pulmonary embolism among British women who had used high-dose OCs. These cases led to British research in the late 1960s that found links between OC use and thromboembolic disease (419, 507) and later, in the mid-1970s, with stroke and heart disease (see pp. 17-19). It also has become clear that OCs have beneficial health effects, too, such as helping prevent cancer of the endometrium and the ovaries (see p. 15). All this research has involved mainly women using pills with 50 µg estrogen or more, higher doses than those in most of today's OCs. Meanwhile, concerns about OCs and risks of breast and cervical cancer continue unresolved (see pp. 21–25).

The main approaches to reducing side effects and health risks have been:

- To lower the doses of both estrogen and progestin.
- To develop new progestins, in hopes of minimizing side effects while maintaining contraceptive effectiveness.
- To screen women more carefully.

The changes in hormone doses and combinations have affected many aspects of oral contraception, including the importance of correct pill use, the nature of side effects, and the profile of OC health risks and benefits. Keeping up with

Family planning workers in Bangladesh use a checklist to screen potential users of OCs. A few questions can usually identify women who should have medical examinations before choosing OCs. Most women can safely use pills without exams. (S.J. STANISKI)

these changes as well as screening women in various ways are thus a must for family planning providers.

Moving to Lower Doses

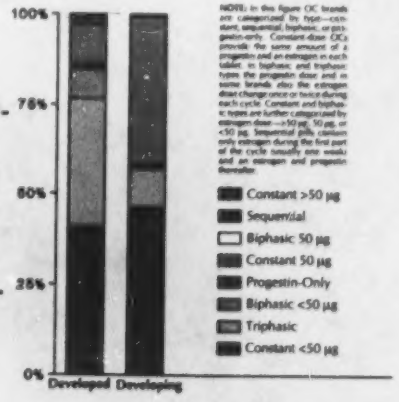
Today's low-dose combined OCs contain less than 50 µg estrogen, down from 150 µg in the first OC and 50 to 100 µg in the OCs of the late 1960s and the 1970s. Estrogen doses of 30 or 35 µg ethinyl estradiol are the most common. Some low-dose pills use 50 µg mestranol, which is roughly as potent as 35 µg ethinyl estradiol.

Progestin doses also have dropped substantially. For example, doses of norethindrone have dropped from 10 mg to 1.0 or 0.5 mg. Because progestins vary in potency by weight, doses of other progestins range from 0.05 mg to 2.0 mg.

Low-estrogen OCs are now the most widely used. Data from 37 areas in 1987 suggest that low-estrogen pills accounted for nearly 85 percent of pharmacy purchases of OCs in the developed areas and almost 60 percent in the developing areas (see Figure 1). In 1988 they comprised almost 80 percent of OCs donated to family planning programs in developing countries.

Figure 1

Pill Types Bought by Pharmacies in 18 Developed and 19 Developing Areas in 1987, Percentage Distributions



Pills With Less Estrogen

The reduction of estrogen doses followed research suggesting that lower doses would reduce circulatory system side effects. One of the first indications came in 1970, with a report to the UK Committee on Safety of Drugs that thromboembolic disorders were more likely with higher estrogen doses (227). Subsequent clinical trials in the US found that estrogen doses as low as 20 µg were effective at preventing pregnancy. They also found that side effects such as nausea, vomiting, and headache occurred less often with less estrogen. Menstrual bleeding irregularities were more frequent, however (387).

Trials of low-estrogen OCs conducted in the early and mid-1970s usually reported pregnancy rates of less than one per 100 women per year. These rates are not significantly different from rates for higher-dose OCs (see p. 12). Most of the pregnancies were attributed to users' failures to take pills on schedule (18, 21, 24, 39, 40, 48, 51, 60, 146, 147, 219, 265, 332, 390, 423, 427, 431, 481, 515, 550).

Studies that looked at hormone doses, pregnancy rates, and pill-taking practices suggest that a woman using low-dose OCs needs to be especially careful to take her pill every day (86, 153, 388). Women who miss low-dose pills on the last days of the pill cycle or start the next cycle late may face particular risk of pregnancy. These errors lengthen the hormone-free interval between cycles (183, 184) (see box, p. 12).

Breakthrough bleeding (intermenstrual bleeding requiring some external protection or pads) and amenorrhea (lack of bleeding at the end of the pill cycle) are common side effects of OCs with low estrogen doses. Some clinical trials involving women using OCs with 30 or 37.5 µg estrogen for at least a year found that 25 to 50 percent of users experienced such effects. Less than 10 percent stopped using OCs because of them, however (18, 60, 187, 265, 481, 515, 550). One trial found that significant increases in discontinuation due to bleeding problems occurred only when the estrogen dose was lowered to 20 µg (48).

Bleeding irregularities are most common in the early months of OC use and then diminish (18, 40, 60, 249, 265, 332, 360, 515, 558). A 1974 comparison of 30 µg and 50 µg estrogen doses—one of the few direct comparisons—found that in the first pill cycle users of the low-dose formulation were twice as likely to experience breakthrough bleeding. By the third cycle, however, the incidence had decreased in both groups, and there was no longer any significant difference between the two. Spotting (light bleeding) was more common in the users of low-dose OCs for somewhat longer, but the difference disappeared by the sixth cycle. The menstrual cycles of the low-dose users were shorter, with a longer period of bleeding. The incidence of amenorrhea was similar in the two groups (112).

Missing pills increases bleeding irregularities as well as pregnancy risks. A US study found that breakthrough bleeding was 13 to 16 times more likely in cycles when women missed a pill, even if they made it up the next day (476). An unfortunate pattern may develop in some women's pill-taking habits: they miss a pill, causing bleeding. Because of the bleeding, they skip more pills, and more bleeding results. Eventually they may stop OCs entirely. To avoid this, as well as to ensure contraceptive protection, family planning programs are focusing attention on helping women to take pills regularly (see **Population Reports**, *Counseling Guide to Oral Contraceptives*, forthcoming).

Other side effects are less common with low-estrogen doses than with doses of 50 µg or more. The 1974 comparison found significantly less cramping, nausea, and breast discomfort among the low-dose users (112). Similarly, studies that compared formulations with estrogen doses ranging from 15 to 40 µg noted that headaches, gastrointestinal disturbances, cramps, and breast discomfort decreased with the estrogen amount (24, 277, 387).

Different Progestins

The progestin doses in OCs vary widely because progestins differ greatly in potency by weight. Doses of progestins in the norethindrone family—norethindrone, norethindrone acetate, ethynodiol diacetate, and lynestrenol—range from 0.4 to 2 mg. Pills containing the more potent progestins levonorgestrel, desogestrel, and the recently developed ges-

todene use doses of 0.05 to 0.15 mg. The different progestins also have different physiological effects and interact with estrogen differently, possibly modifying its effects (56, 483).

Along with estrogens, progestin doses influence bleeding patterns. Recent studies by Family Health International (FHI) in Brazil, Panama, and Sri Lanka observed that higher progestin doses reduced intermenstrual bleeding. In all three countries women using pills containing 35 µg estrogen and 1.0 mg norethindrone had significantly less breakthrough bleeding than women using pills with 35 µg estrogen and 0.5 mg norethindrone (17, 34, 331).

At equal levels of contraceptive effectiveness, progestins of the norgestrel family seem to control bleeding irregularities better than those in the norethindrone family (26, 38, 120, 182, 193, 326, 394, 549). A combination of 0.15 mg levonorgestrel and 30 µg ethinyl estradiol is now the world's most widely used OC, sold under such brand names as Microgynon 30, Minigynon 30, and Nordette. Studies in a number of countries, including large World Health Organization (WHO) multinational clinical trials, have suggested that this combination controls bleeding patterns as well as levonorgestrel-containing pills with 50 µg ethinyl estradiol and better than low-estrogen pills using other progestins (158, 315, 541, 545). The WHO studies and others suggest, although not conclusively, that nonmenstrual side effects such as nausea, vomiting, and headache may be more common with levonorgestrel than with other progestins (21, 159, 182, 326, 427, 541, 545, 549).

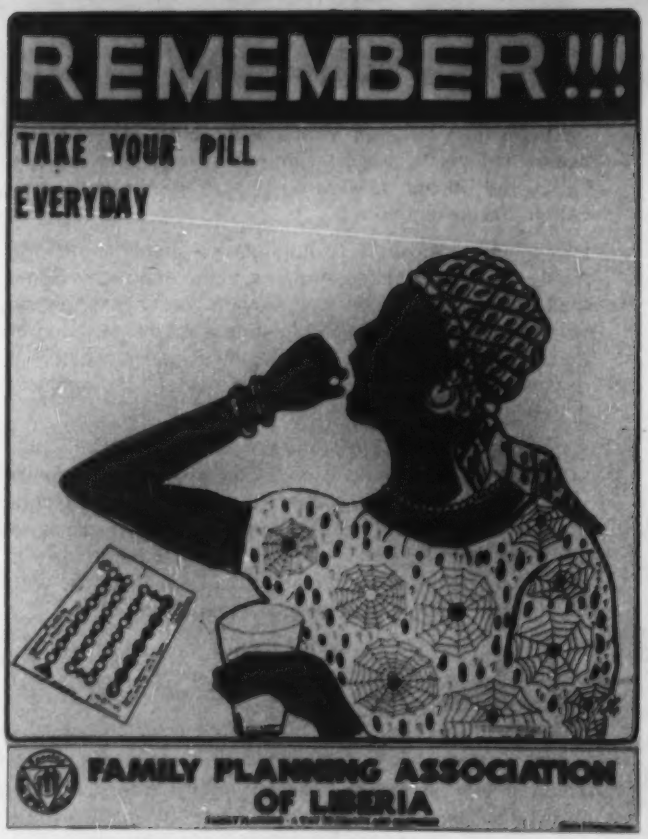
■

Less Risk with Low Doses?

It has been difficult to ascertain whether lower doses pose less risk of the uncommon, more severe side effects of OCs. Extensive use of low-dose OCs is fairly recent. Thus long-term studies have not yet been possible. A 4-year case-control study of low-dose OCs and risks of circulatory system diseases is planned in the US (9), but in the UK planning for a 5-to-10 year study of OC risks and benefits in 120,000 current OC users has been interrupted by funding difficulties (4).

The major cohort studies of OCs in the 1960s and 1970s—the Royal College of General Practitioners (RCGP) Oral Contraception Study and the Oxford University/Family Planning Association (Oxford/FPA) contraceptive study in the United Kingdom and, in the US, the Walnut Creek Contraceptive Drug Study—observed mainly women using pills with 50 µg estrogen or more. Thus their findings may not apply to OC users today. The two British studies have continued into the 1980s, however, and have begun to generate data on lower-dose pills. In the US in the 1980s the Nurses' Health Study, the Puget Sound Group Health Cooperative study, and the Cancer and Steroid Hormone (CASH) case-control study also have sometimes been able to compare higher and lower doses.

Available data, although limited, suggest that lower doses mean lower risks for some conditions. For example, as pills with less estrogen have come into wider use, OC-related risks of venous thrombosis and stroke appear to have declined (see pp. 17–19). Changing progestin doses and types in order to minimize metabolic effects may also be important to reducing health risks. While the consensus is that lower doses mean lower risks, some researchers still challenge this conclusion (424).



Taking a pill every day assures effectiveness and minimizes minor side effects—perhaps especially with low-dose pills. Providers are looking for new ways to help women remember to take their pills.

If the health risks of OCs diminish with dose, will the benefits diminish, too? OC use lowers the risk of benign breast disease, for example. This effect is associated with progestin dose. Lower doses provide less protection (55, 418). Also, women who use OCs have lower incidences of ovarian and uterine cancer. The research demonstrating these protective benefits, however, has involved mainly users of pills with 50 µg estrogen or more. It is not yet clear whether these and other secondary health benefits of OCs are dose-related and, if so, to what extent (see pp. 15–17).

■

Progestin-Only and Multiphasic Pills

Progestin-only and multiphasic pills are special types of low-dose OCs. The progestin-only "minipill" was developed in the early 1970s in response to reports that estrogen was responsible for thromboembolic side effects of OCs. Each minipill tablet contains 0.3 to 0.6 mg of the norethindrone progestins or 0.03 to 0.0375 mg levonorgestrel. Minipills are taken continuously, with no hormone-free intervals between cycles.

Despite the concern about the side effects of estrogen, minipills have never become popular. They are somewhat less effective than combined OCs (see p. 13). Bleeding irregularities also are more common with minipills (363, 401, 541). An advantage of minipills is their safety for breastfeeding women (see box, p. 16).

The newest OCs are the multiphasics, which in the 1980s have become the most widely used pills in some developed

countries. The doses in these OCs change during the pill cycle in order to provide menstrual cycle control, keep hormone doses low, and still prevent ovulation (90). In one type the daily progestin dose increases at mid-cycle, around the time when ovulation would occur, and then decreases again. In others the progestin amount increases in two steps. One variety also increases the estrogen dose from the seventh to the eleventh days.

Like other low-dose OCs, multiphasics appear to provide highly effective contraception when taken correctly. Some trials have observed that they provide good cycle control, with minimal breakthrough bleeding, spotting, or amenorrhea (22, 126, 156, 359). There is little evidence to date that risks of serious health problems are less with multiphasics than with other low-dose OCs (109, 453, 454).

A possible disadvantage of multiphasics is that taking pills out of order will result in an incorrect dose. This might reduce both contraceptive effectiveness and bleeding control (299, 323). Some family planning program managers think that the need to distinguish between two or three sets of pills in one cycle might lead to more incorrect use with multiphasics than with other low-dose pills (5, 495).

Coming Soon—

Population Reports

Counseling Guide to Oral Contraceptives

Like the widely acclaimed Population Reports *Counseling Guide*, J-36, December 1987, the *Counseling Guide to Oral Contraceptives* will be a simple and handy manual that family planning providers can use during training and on the job. Offering more detail than the original *Counseling Guide*, the new *Counseling Guide to Oral Contraceptives* will explain what to discuss with clients about the pill and how to help a client decide if the pill is the best method for her.

Combined in the same issue: "Oral Contraceptives and Family Planning Programs," a discussion of the ways that family planning providers are finding to serve their OC clients better.

Use

Today nearly 63 million married women throughout the world are using oral contraceptives. Over 60 percent of these OC users live in developing countries (see Table 1).

The estimate of 63 million married women using OCs worldwide is based on various sources—sales data, donor agency shipment reports, fertility and family planning surveys, and family planning program statistics on a country-by-country basis. No one source of data covers all routes of supply, all years, and all users at the same time. For many countries no data are available at all, and estimates must be based on similar countries in the region. Basically, national estimates are made by applying the percentage of married women of reproductive age, as reported in representative sample surveys, to the estimated number of married women of reproductive age for the year of the estimate. Any data from other sources are used to adjust the estimate to account for trends since the survey.

In the developed countries an estimated 24 million married women used OCs in 1988. This represents almost 14 percent of married women of reproductive age. In developing countries there were an estimated 39 million married women using OCs, or 6 percent of married women of reproductive age, in 1988, compared with 25 million in 1981.

Table 1

Oral Contraceptive Use Worldwide, 1988, Estimated Primarily from Survey and Sales Data

	Estimated % of MWRA Using OCs	Estimated No. of Married OC Users (in millions)
DEVELOPED AREAS		
Australia & New Zealand ..	30	0.9
Europe		
East (includes USSR)	6	3.5
North (Scandinavia)	21	0.6
South	14	2.8
West	29	8.8
Japan	1	0.2
North America	18	7.0
South Africa	15	0.6
Subtotal	14	24.4
DEVELOPING AREAS		
Asia		
China	5	10.1
Indian subcontinent	2	3.2
Other Asian	13	9.2
Latin America & Caribbean .	16	8.3
Near East & North Africa ..	12	4.4
Tropical Africa	5	3.3
Subtotal	6	38.5
TOTAL	8	62.9

MWRA = married women of reproductive age

Commercial Sales

Commercial sales data for 18 developed areas and 19 developing areas suggest that since 1981 OC sales in developed countries have increased by about 15 percent, or 2.5 percent per year, while in developing countries sales have increased by about 39 percent, or 6.4 percent per year, mainly because of increasing sales in Latin America (see Table 2).

Data on sales in selected countries are compiled by IMS, an international market research firm. IMS collects the purchase invoices from a sample of pharmacies in each country and, in some countries, from hospital clinics. IMS data cover the major commercial markets. They do not include most Asian, Eastern European, Near Eastern, and African countries. Data cover OCs sold both with and without prescription but not donations or free samples. They

also do not cover sales through outlets other than pharmacies.

IMS data can be used to estimate the minimum percentage of women supplied through regular commercial channels. The number of OC cycles sold is divided by 13, which is the number of cycles a woman would usually use in a year, and the result is divided by the number of women of reproductive age, whether married or not.

Among areas with IMS data the highest levels of OC use through pharmacies are in the European countries of Austria, Belgium, France, the Netherlands, Sweden, and West Germany and in Australia and New Zealand (see Figures 2 and 3). In each of these countries OC sales in 1987 would have supplied 20 percent or more of all women age 15–44 for the year. In fact, in Belgium, France, and the Netherlands, sales would have supplied more than 30 percent of women of reproductive age. US sales, which would have supplied 17 percent in 1974, the peak year, dropped to coverage of about 9 percent in 1982. The figure has remained fairly stable since then (see Figure 2). The mid-1970s drop in a number of English-speaking countries followed publicity given re-

Table 2

Pharmacy Purchases of Oral Contraceptives, by Country and Year, 1981-1987

(in Thousands of Cycles)

	1981	1982	1983	1984	1985	1986	1987
ASIA							
Indonesia	2,274.4	1,649.6	2,392.7	2,208.7	3,537.6	1,542.9	1,466.2
Korea, Rep. of	3,324.5	3,426.8	3,015.5	3,001.9	3,054.0	2,755.6	2,801.1
Pakistan	301.3	327.3	456.4	447.7	475.6	501.4	557.3
Philippines	1,180.5	1,281.7	1,262.5	1,421.5	1,682.7	1,759.0	1,989.1
Taiwan	NA	NA	853.6	802.2	958.1	1,272.9	991.5
Subtotal	7,080.6	6,685.5	7,980.6	7,882.1	9,708.1	7,831.8	7,805.3
AFRICA & NEAR EAST							
Egypt	3,489.6	4,105.5	5,184.5	4,484.5	4,729.5	5,437.9	5,135.6
Francophone Africa[a]	724.0	915.8	1,012.4	1,195.5	1,149.5	1,261.2	1,339.9
Morocco	1,661.7	1,861.9	1,957.1	1,776.2	1,973.3	2,090.9	2,280.9
Saudi Arabia	1,183.7	1,590.3	1,405.2	1,209.6	1,254.8	1,158.9	1,739.0
Turkey	4,572.8	3,785.3	3,619.3	3,494.6	3,645.7	3,921.2	3,964.9
Subtotal	11,631.8	12,258.8	13,178.5	12,160.4	12,752.8	13,870.1	14,460.4
LATIN AMERICA							
Argentina	4,262.7	5,135.2	5,415.8	5,965.3	6,184.1	6,737.1	8,986.6
Brazil	37,201.4	35,491.9	38,558.7	38,297.1	44,511.8	60,586.9	55,375.9
Central America[b]	1,207.2	990.5	1,038.5	1,146.5	955.6	1,012.2	1,145.7
Chile	1,229.6	1,258.8	1,259.1	1,296.9	1,283.0	1,638.0	1,851.2
Colombia	3,598.6	4,930.2	5,181.5	5,207.7	5,697.6	4,963.7	4,835.2
Ecuador	654.7	1,014.0	746.8	682.8	755.6	884.1	837.8
Mexico	12,770.3	13,567.2	14,248.1	11,418.9	13,560.2	13,597.9	10,837.6
Peru	1,270.0	1,169.6	1,085.5	1,121.5	1,080.4	1,294.5	1,258.1
Venezuela	3,753.3	3,845.3	4,303.5	4,037.2	4,067.0	4,167.9	5,571.6
Subtotal	65,947.8	67,402.7	71,837.5	69,173.9	78,095.2	94,882.2	90,699.7
Subtotal, Developing Areas	**84,660.2**	**86,346.9**	**92,996.6**	**89,216.3**	**100,556.1**	**116,584.1**	**112,965.4**
DEVELOPED AREAS							
Australia	9,325.9	10,627.3	10,706.0	11,405.4	11,770.1	13,450.5	14,037.9
Austria	4,211.2	4,321.4	4,625.9	4,848.4	4,759.4	4,982.2	4,946.4
Belgium	8,065.0	8,470.0	8,498.3	8,735.2	8,831.0	9,122.1	9,637.2
Canada	14,287.5	13,398.8	14,194.0	14,826.8	19,223.0	14,789.2	15,482.2
Finland	1,560.1	1,689.4	1,876.0	2,083.6	2,294.8	2,457.2	2,549.3
France	41,005.5	41,889.9	42,921.1	44,306.6	45,960.9	48,635.0	47,633.8
Greece	391.7	367.3	434.4	454.6	477.2	613.5	659.6
Ireland	620.5	746.7	824.8	866.3	877.9	964.7	967.5
Italy	6,693.8	6,703.7	7,170.8	7,568.0	9,350.9	10,563.8	11,194.3
Netherlands	12,108.0	12,828.2	13,192.2	13,722.7	14,471.7	15,381.7	16,428.3
New Zealand	2,429.9	2,409.7	2,563.9	2,736.4	2,698.7	2,811.6	2,861.4
Portugal	4,663.6	4,937.8	4,745.9	5,410.5	6,021.4	5,869.5	6,221.9
Puerto Rico	425.0	316.4	241.5	338.8	253.0	288.2	281.5
South Africa	1,762.6	1,660.4	1,581.4	1,594.1	1,609.2	1,596.9	1,516.3
Spain	11,703.9	11,253.9	11,321.0	11,339.1	11,435.3	12,037.5	11,855.5
Sweden	5,681.1	6,057.8	6,323.1	6,144.3	5,806.9	5,765.5	5,354.8
United Kingdom	36,566.4	40,787.5	43,648.8	41,811.9	40,513.2	41,566.2	40,153.1
United States	65,952.9	64,522.6	64,485.8	66,244.7	65,430.6	66,491.7	68,424.6
West Germany	41,960.8	42,876.6	43,758.0	45,275.7	44,830.4	44,837.7	48,308.4
Subtotal, Developed Areas	**269,415.5**	**275,865.3**	**283,113.1**	**289,713.0**	**296,615.7**	**302,224.8**	**308,514.0**
GRAND TOTAL	**364,075.6**	**362,212.3**	**376,109.7**	**378,929.3**	**397,171.8**	**418,808.9**	**421,479.4**

Source: IMS (224)

NA = Not available

[a] *Cameroon, Congo, Gabon, Ivory Coast and Senegal*

[b] *Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama*

Figure 2. Estimated Percentage of Women Age 15–44 Buying OCs from Pharmacies, English-Speaking Countries, 1964–1987

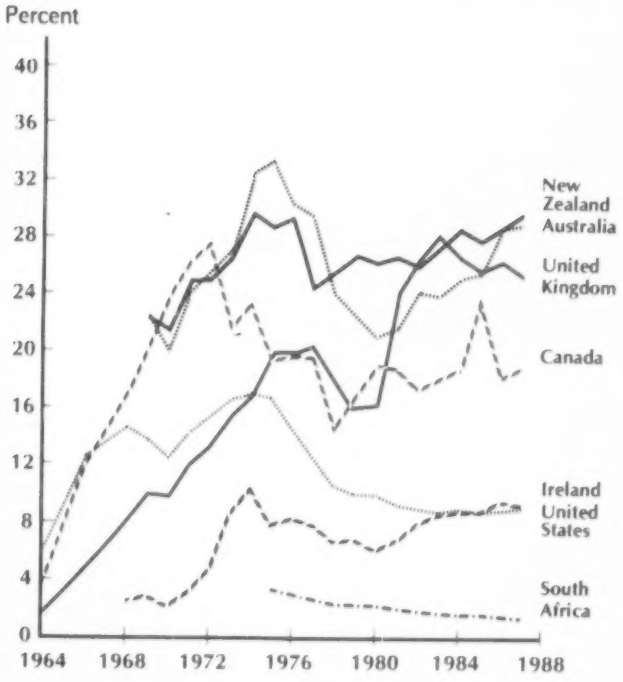


Figure 3. Estimated Percentage of Women Age 15–44 Buying OCs from Pharmacies, Continental Europe, 1964–1987

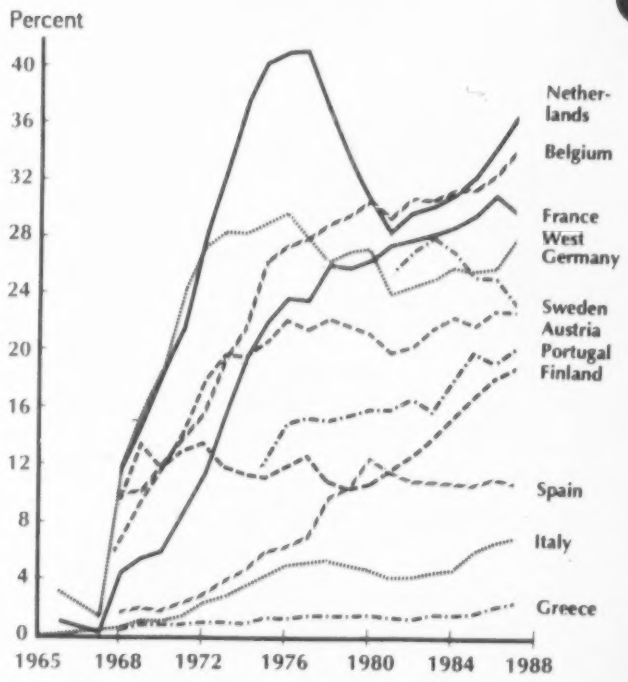


Figure 4. Estimated Percentage of Women Age 15–44 Buying OCs from Pharmacies, Latin America, 1968–1987

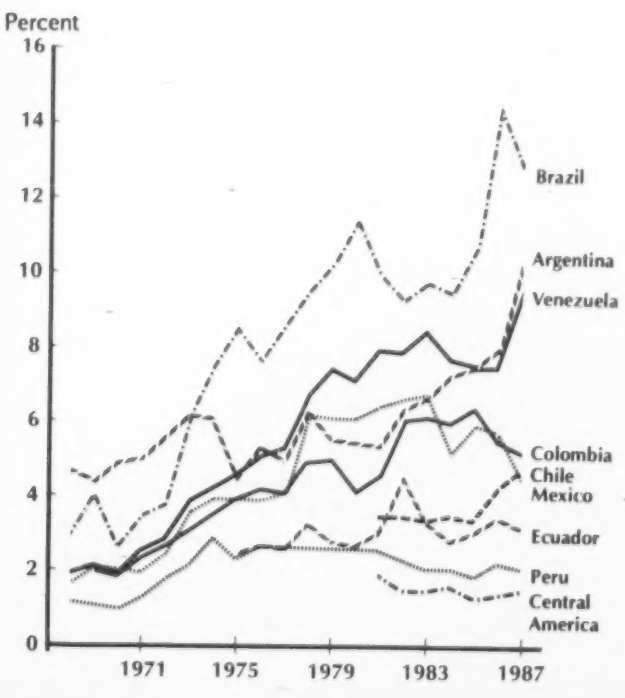
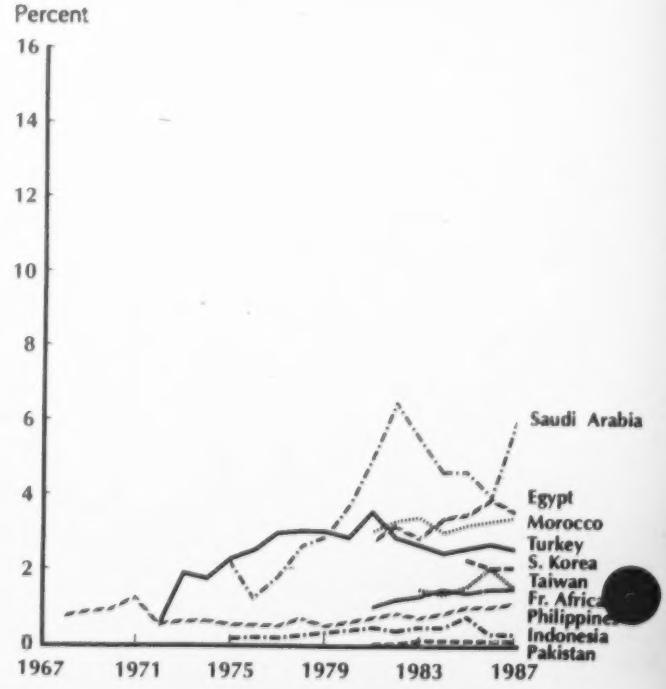


Figure 5. Estimated Percentage of Women Age 15–44 Buying OCs from Pharmacies, Asia, Africa and the Near East, 1968–1987



search on the link between OCs and heart attack. As has occurred with other technologies (562), extensive news coverage led to widespread adverse public reaction.

In developing countries levels of OC sales, like overall contraceptive use, remain less than in developed countries. OC sales are growing, however. In many of the nine Latin American areas with IMS data, the percentage of women who could be supplied with OCs through pharmacies increased steadily through the 1970s. Some increases have continued into the 1980s (see Figure 4). In most of the 10 other developing areas with IMS data, sales have grown along with the population (see Table 2). In most instances the percentage of women of reproductive age who could be supplied by these sales has changed little (see Figure 5).

■

Sales of Low-Estrogen OCs Growing

There has been a dramatic shift to lower-estrogen pills in the 1980s. This shift can be seen in IMS data, which cover 1981–87 sales by brand for the 10 best-selling brands in each country. In most areas the top 10 brands account for the great majority of pharmacy purchases.

By 1987 low-estrogen OCs accounted for about 85 percent of all pharmacy purchases of combined OCs in the 18 developed countries reporting. Low-estrogen pills accounted for about 60 percent of purchases in the 19 developing areas reporting (see Figure 6). Sales of OCs with 50 µg estrogen have decreased, but in 1987 they retained a substantial portion of the market in a few areas—Brazil, Central America, Colombia, Francophone Africa, Morocco, Pakistan, the Philippines, Taiwan, and Turkey. In nearly all reporting countries high-estrogen pills have disappeared from the top 10 brands.

Triphasics account for a substantial and growing portion of pill sales. Among the 18 developed countries triphasics accounted for over half of 1987 purchases of OCs by pharmacies in six countries and between one-third and one-half in six others. Also, triphasics amounted to more than one-quarter of all OCs bought by pharmacies in Taiwan and Venezuela and to smaller but still substantial fractions in Argentina, Chile, Central America, Indonesia, and Peru (see Figure 6). Triphasics, which became available in the early 1980s, have been aggressively promoted to health care providers. Biphasics, which in some formulations have a maximum of 50 µg estrogen and in others, less, have not sold as well. Sequential OCs, also called normophasics, are popular in a few countries, primarily in Europe. Sequentials contain an estrogen but no progestin during the first part of the cycle. Most brands provide estrogen alone for one week, followed by two weeks of estrogen and progestin combined.

Although progestin-only brands have not sold in great numbers worldwide, in a few countries they are among the 10 best-sellers. Most notably, in Chile 1987 sales of progestin-only pills accounted for 16 percent of all pharmacy purchases of OCs, up from about 10 percent in 1981. Among developed countries minipill purchases were greatest in New Zealand and Finland (see Figure 6).

■

Donor Agency Shipments

Donor agencies purchase contraceptives in bulk and, in response to requests, supply them to family planning programs in developing countries. From 1985 to 1988—the most recent years for which data are available from all major donor agencies—shipments of OCs averaged about 74.3 million cycles per year, enough to protect about 5.7 million

Figure 6. Pill Types Bought by Pharmacies in 37 Areas in 1987, Percentage Distributions

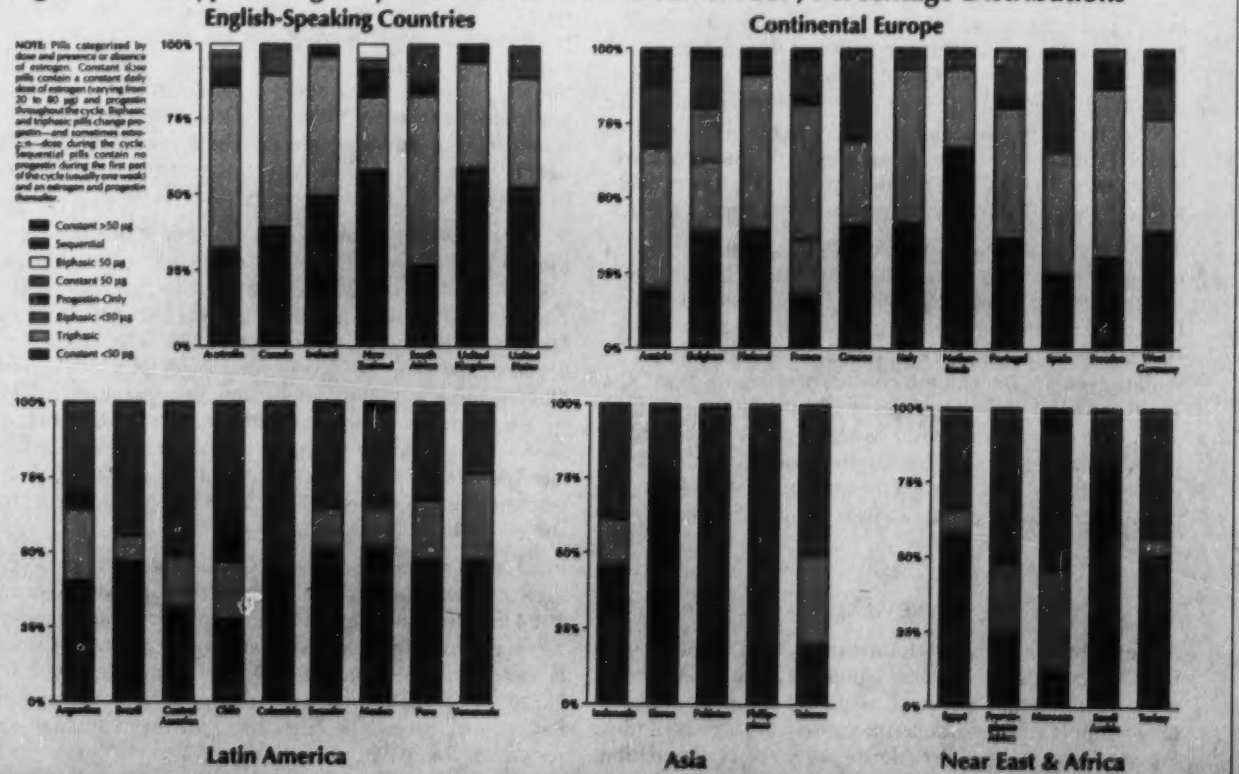


Table 3

Donor Agency Deliveries of Oral Contraceptives, by Agency, 1982-1988

(in Thousands of Cycles)

Agency	1982	1983	1984	1985	1986	1987	1988	Average 1985-88
US AID	NA	NA	21,114	34,767	25,082	36,114	29,123	31,272
UNFPA	NA	NA	NA	5,356	9,168	38,554	7,524	15,150
IPPF	8,832	5,195	6,424	7,828	10,670	14,174	12,611	11,321
FPIA	26,461	4,109	7,832	8,644	6,980	6,590	12,241	8,614
CIDA	0	0	0	2,800	9,800	5,600	6,100	6,075
Pathfinder	630	1,039	633	1,448	1,323	2,339	2,228	1,835
All Donors	35,923	10,343	36,003	60,843	63,024	103,371	69,827	74,266

US AID = United States Agency for International Development
UNFPA = United Nations Population Fund
IPPF = International Planned Parenthood Federation
FPIA = Family Planning International Assistance
CIDA = Canadian International Development Agency
Pathfinder = Pathfinder Fund

NOTE: Figures for US AID include both bilateral donations and donations through cooperating agencies. Figures for FPIA, Pathfinder Fund, and IPPF (Western Hemisphere Region), which act as cooperating agencies, do not include supplies from US AID.

women from pregnancy. This amounts to roughly one-sixth of OCs used in developing countries. This estimate includes countries that receive few or no donated OCs, among them Brazil, China, and India. Excluding these three countries, donor supplies may account for somewhat under one-third of OCs used in developing countries.

Shipments by the United States Agency for International Development (US AID) accounted for about 42 percent of all shipments, averaging about 31.3 million cycles per year (125). Most of these pills are bilateral donations directly to a developing-country government. Some, however, go through various cooperating agencies, such as Family Planning International Assistance, International Planned Parenthood/Western Hemisphere Region, the Pathfinder Fund, and the Futures Group/Social Marketing for Change (SOMARC), which in turn supply family planning programs in developing countries.

Other donors also contribute OCs to developing-country family planning programs. The United Nations Population Fund (UNFPA) accounts for one-fifth of donated oral contraceptives (78); the International Planned Parenthood Federation (IPPF), for one-seventh (142); and other donors, for smaller amounts (see Table 3). In 1987 UNFPA allocated about 31 million cycles to Bangladesh, to be shipped over a 3-year period (78). This accounts for the sharp increase in total OCs supplied by donors between 1986 and 1987.

Since 1982 donors have shipped only pills containing 50 µg estrogen or less, and more and more of these are pills with less than 50 µg estrogen. In 1987, among donors shipping OCs to all regions of the world, only UNFPA shipped more standard than low-dose OCs. The UNFPA allocation of 31 million cycles to Bangladesh consists of standard-dose OCs. The Bangladesh government prefers these pills because they are a brand that Bangladeshi women appear to like (440). US AID shipments have been more than 75 percent low-estrogen pills since 1985. Only IPPF and UNFPA have provided triphasics, and those in very small quantities.

Survey Data

Surveys provide the only information on OC use that comes from users rather than from suppliers. Data have been gathered primarily in several rounds of national representative sample surveys around the world—the World Fertility Survey, Contraceptive Prevalence Surveys (see **Population Reports**, *Fertility and Family Planning Surveys: An Update*, M-8, September-October 1985), and, most recently, the Demographic and Health Surveys. In developed countries a variety of other national surveys also provide data. Surveys supply the most accurate data on the percentage of married women using OCs. Most surveys do not cover unmarried women, however, except in Latin America, where surveys have usually covered all women living in union whether formally married or not. Also, surveys do not provide year-by-year data, nor do they usually provide detail such as the type of OC used.

Surveys, like sales data, show that some of the highest levels of pill use are in Europe (see Table 4). In Austria, Hungary, and the Netherlands, surveys have found that about 40 percent of married women of reproductive age used OCs. In fact, in 7 of 11 Western European countries with surveys, at least 25 percent of married women of reproductive age use OCs. Use estimates from surveys differ from those based on sales data (see Figures 2–5), for several reasons. First, surveys cover only *married* women, while the estimates based on sales data cover all women, married or not. Second, in many countries, especially in the developing world, many women obtain OCs from sources other than pharmacies. Third, surveys record use at a point in time—the date of the survey—while the estimates from sales data are made as if all OC users continued for a full year.

Surveys show that pill use is somewhat less in North America than in Europe. Some 17 percent of US married women age 18–44 used OCs in 1987 (144), as did 15 percent of Canadian married women age 18–44 in 1984 (30). OC use in the US appears to have increased since 1982, when 13 percent of married women age 15–44 were using OCs (337). In the US, OC use is common among unmarried women. A 1987 survey conducted for the Ortho Pharmaceutical Corporation found that 48 percent of unmarried sexually active women age 18–44 used OCs. Overall, about 24 percent of all US women age 18–44 used OCs in 1987, according to the survey (144).

In developing areas surveyed, OC use has ranged from a high of 31 percent in Zimbabwe in 1988 and Montserrat in 1984 to 2 percent or less in Haiti, Nepal, Pakistan, and most surveyed countries of sub-Saharan Africa. Generally, OC use is highest in Latin America, followed by the Near East and North Africa. Levels of use are intermediate in Asia and the Pacific and, except for Zimbabwe, lowest in sub-Saharan Africa (see Table 4).

Table 4

Percentage of Married Women of Reproductive Age Using Oral Contraceptives (OCs)

Representative Sample Surveys in Selected Countries, 1978-1988

[a] Includes traditional methods (breastfeeding, douche, abstinence, folk) except where noted

[b] Not indicated whether traditional methods included

[c] Excludes traditional methods

[d] Includes women in union

[e] Women sexually active in the last four weeks

NOTES: This table lists only countries where one survey since 1979 shows 5 percent or more of married women of reproductive age used OCs.

All numbers are rounded to whole numbers.

Region & Country	Ref. No.	Year	% Using Any Method[a]	% Using OCs	% of Contraceptors Using OCs
AFRICA					
Botswana	288	1984	29	11	37
	47	1988	33	15	45
Mauritius	163	1985	75	21	28
Zimbabwe	288	1984	40	24	60
	560	1988	43	31	72
ASIA & PACIFIC					
Bangladesh	286	1979-80	9	4	41
	563	1985	25	5	20
China	83	1982	70	6	8
	84	1985	74	5	6
Indonesia (urban)	288	1983			
Jakarta	288		44	11	6
Medan	288		36	11	31
Semarang	288		54	14	26
Surabaya	288		46	15	32
Ujung	288		33	11	34
All Indonesia	225	1987	48	16[b]	34
Korea, Rep. of	288	1979	55	7	13
	493	1985	70	4	6
Malaysia (peninsular)	493	1984	51	12	23
Philippines	493	1983	39	7	17
	493	1986	45	6	14
Singapore	127	1982	74	12	16
Thailand	288	1981	59	20	34
	250	1984	65	20	31
	79	1987	68	20[b]	30
LATIN AMERICA & CARIBBEAN					
Antigua	31	1981	39	16	41
Barbados	31	1980-81	47	17	36
Brazil					
Amazonas (urban)	288	1982	53	16	30
Northeast region	288	1980	37	13	34
Piauí State	288	1979	31	10	32
	288	1982	35	10	28
São Paulo	288	1978	66	28	43
Southern region	288	1981	66	33	50
All Brazil	25	1986	65	25	38
Colombia	288	1980	51	19	37
	92	1986	63	16	25
Costa Rica	288	1981	66	22	34
	94	1986	68	19[c]	28
Dominica	31	1981	49	16	33
Dominican Republic	288	1983	47	9	20
	114	1986	50	9[b]	18
Ecuador	288	1979	35	10[b]	30
	119	1987	44	9	19
El Salvador	123	1985	47	7	14
Grenada	237	1985	31	8	25
Guatemala	288	1983	25	5[c]	19
	180	1987	23	4	17
Honduras	288	1981	27	12	45
	238	1984	35	13	36
	561	1987	41	13	33
Jamaica	335	1979	55	24[c]	43
	288	1983	52	21[c]	39
Mexico	288	1979	40	14	34
	493	1982	48	14	30
	493	1987	53	10	18
Montserrat	235	1984	53	31	58
Nicaragua	493	1981	27	10	37
Panama	288	1979-80	62	19	31
	181	1984	59	12[d]	20[d]
Paraguay	288	1979	39	13[d]	34[d]
	493	1987	45	14	30
Peru	288	1981	43	5	12
	368	1986	46	7	14
St. Kitts-Nevis	236	1984	41	20	49
St. Lucia	31	1981	43	21	49
St. Vincent	31	1981	42	13	31
Trinidad & Tobago	197	1987	53	14	27
NEAR EAST & NORTH AFRICA					
Egypt, rural	288	1980	16	12	76
All Egypt	288	1980	25	17	69
	429	1984	30	17	54
	122	1988	38	15	41
Jordan	288	1983	26	8[c]	31
Morocco	288	1979-80	20	15	72
	288	1983-84	27	18	67
	334	1987	29	23	79
Tunisia	288	1983	42	6	14
	488	1988	50	9	18
Turkey	186	1983	53	8	14
DEVELOPED AREAS					
Austria	338	1981-82	71	40	56
Belgium	89	1982-83	81	32	40
Canada	30	1984	73	11	15
France	283	1988	72	32	44
Hungary	493	1986	73	39	54
Italy	37	1979	78	14	18
Netherlands	496	1982	78	38[d]	49[d]
New Zealand	361	1983-86	74	15	20
Portugal	493	1979-80	66	19	29
Puerto Rico	493	1982	70	9	13
South Africa	493	1981	48	15	13
Spain	451	1985	59	16	27
Sweden	472	1981	78	23[e]	32[e]
Switzerland	(215)	1980	71	28	37
UK (England & Wales)	492	1983	83	24[d]	29[d]
United States	337	1982-83	68	13	19
	144	1987	74	17	23
West Germany	115	1985	78	34	43

Missing and Making Up Low-Dose OCs

How well is a low-dose OC user protected against pregnancy if she forgets pills? In theory, she is less protected than if she were taking higher dose pills. With higher doses more synthetic hormones remain in her body even after she misses a pill or two. If she misses low-dose pills, however, declining hormone amounts come nearer to levels that might allow ovulation.

Chances of Ovulation

In practice, however, the chance of ovulation seems to be low. In a study in India, 15 of 54 women ovulated after skipping two consecutive pills in the first half of the cycle (86). In a similarly designed Swedish study, however, only one of 32 women ovulated, and she may have accidentally missed a third pill (519). In another Swedish study none of 10 women ovulated after waiting nine instead of seven days to start the next cycle (274). Some of the difference in the findings could be due to different progestins (183). Indian research involved OCs containing norethindrone acetate while Swedish studies involved OCs containing levonorgestrel.

Whether ovulation occurs may depend partly on when pills are missed in the OC cycle. Comparison of the Swedish studies shows that follicular activity—the earliest stage in the ovulation process—occurred 37 percent of the time when women started cycles two days late compared with 16 percent of the time when they missed two pills in the middle of the cycle (274, 519). Missing the last or the first pills of a cycle allows more time for follicular development. Thus eventual ovulation may be more likely (153, 183, 327, 477).

To minimize the chances of pregnancy, OC users need to know how to correct errors and get back on their pill-taking schedule. Since the risk of ovulation seems to be small even if low-dose OCs are missed, most experts think that rules established for higher-dose pills can apply to low-dose pills as well (see box in center).

In Europe some family planning providers and OC manufacturers have added a rule for a woman who misses a pill in the last week of her cycle: a woman should take the pill as soon as she remembers, continue normal pill-taking, use an additional method for one week, and begin her next cycle immediately after the current one, without any pill-free or hormone-free interval. Thus a woman using 21-pill packs would not have a 7-day pill-free interval. A woman using 28-day pill packs would skip the last seven pills (usually sugar, vitamin, or iron tablets) and go immediately to the first pill of her next cycle (183, 185). Family planning providers are divided over whether the additional protection is worth making the rules more complicated.

In counseling clients about OCs, providers should emphasize that starting pill cycles on time is very important. Starting cycles correctly seems easier with 28-day pill cycles than with 21-day cycles because, with the former, a woman takes a pill every day. Counseling also should emphasize that regular pill-taking minimizes side effects that can cause women to skip pills or quit taking them entirely.

Rules for Correcting Errors

If a woman realizes that she has:

Missed One Pill

She should immediately take it and then continue as usual with her cycle. (Using another contraceptive method such as a condom for seven days after missing one pill is an optional added precaution.)

Missed Two Pills in a Row

She should take two pills as soon as she remembers, take two more pills again the next day, and then continue taking one pill each day. She should also use another method of contraception for the rest of that cycle.

Missed More than Two Pills in a Row

She should stop taking her pills and use another method for the rest of the cycle. She can start a new cycle of pills at her next menstruation. If her menstruation is late, she should continue with her other method and find out if she is pregnant before starting pills again.

Benefits of Oral Contraceptives

The substantial and widespread benefits of oral contraceptives are often taken for granted or forgotten amid the controversies and concerns about the pill that range from legitimate scientific questions to unfounded neighborhood rumors. The chief benefit of OCs, of course, is their effectiveness in preventing pregnancy. OCs protect millions of women from the burden of unwanted pregnancies and childbearing and prevent thousands of women's deaths in childbearing. Other important benefits of OCs are reductions in the risks of iron-deficiency anemia and of endometrial and ovarian cancer.

Fertility-Related Benefits

The fertility-related benefits of oral contraceptives include not only:

- Effectively preventing unwanted pregnancy,

but also

- Better maternal and child survival,
- Prevention of ectopic pregnancy, and
- Reduced risk of pelvic inflammatory disease.

Preventing pregnancy. The most important benefit of the pill is its convenient, highly effective, and reversible protection against unwanted pregnancy. All widely available types of pills—combined estrogen-progestin, progestin-only, and multiphasics—are highly effective. Among women using combined estrogen-progestin OCs correctly, in the first year of use pregnancy occurs in fewer than one in every 100.

Most authorities consider combined pills containing less than 50 µg of estrogen to be as effective as those containing 50 µg or more. The few comparative studies have reported no significant difference (48, 259, 313).

Few studies have been conducted in which women were randomly assigned to use one type of pill or the other. A multicenter World Health Organization (WHO) study compared six combined OCs containing 20 to 50 µg estrogen. No significant differences in effectiveness appeared. Even the highest pregnancy rate observed was less than 1.5 pregnancies per 100 woman-years of use (545).

Progestin-only pills may be slightly less effective than any combined pills. In clinical trials failure rates range from about 1 to 3 per 100 woman-years of use. While minipills fail to prevent ovulation in about 40 percent of users, other effects contribute to contraceptive protection. In particular, progestins change cervical mucus so that sperm find it more difficult to penetrate (153, 194, 398, 511).

Because all pills are so effective, identifying any small differences in effectiveness among specific formulations would require very large studies. In clinical trials other factors may be more important than formulation. Such factors include differences among pill groups in age and other characteristics of women recruited, the number lost to follow-up, and compliance with the pill-taking regimen (487).

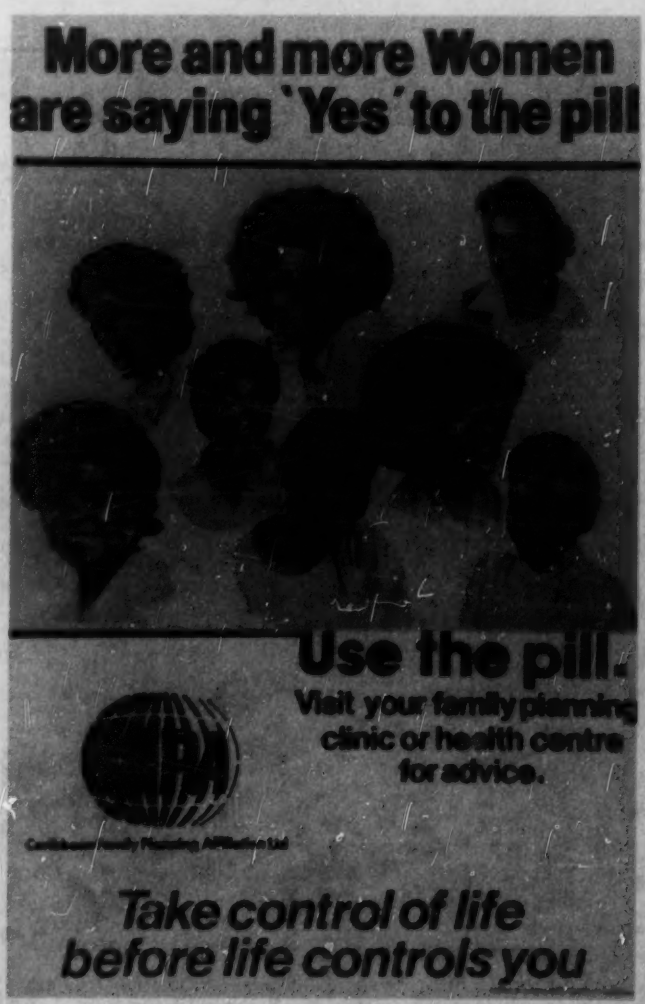
Because women sometimes forget to take their pills, switch to another method, or discontinue contraceptive use altogether, actual effectiveness in day-to-day use is often less than reported in clinical trials. Surveys of married women in the US have found that 2 to 3 percent of women have unplanned pregnancies in the first year of pill use (170, 171, 432, 499). Actual failure rates are probably somewhat higher, however, since abortions are seriously underreported in most surveys (143, 205).

In some developing countries OC failure rates have been much higher. For example, according to World Fertility Survey data from five Latin American countries in the 1970s, the pregnancy rate among OC users was 8 per 100 per year. By comparison, the pregnancy rate among IUD users was 5 per 100 (165). In the Philippines a 1980 national survey reported 19 pregnancies per 100 woman-years of pill use compared with 4 per 100 among IUD users (273). Other population-based surveys report pregnancy rates among OC users of 15 per 100 woman-years in Bangladesh (85) and 13 per 100 woman-years in Sri Lanka (480). Irregular pill-taking may explain these relatively high pregnancy rates.

Multiphasic pills have only recently been widely used, but some evidence suggests that one triphasic formulation may be slightly less effective than combined pills. During their first year on the market in Britain, several pregnancies were reported among users of a triphasic pill consisting of .05/.075/.125 mg levonorgestrel and 30/40/30 µg ethinyl estradiol (133, 173). Subsequently, a study in the Netherlands found that, from 1982 to 1984—when this triphasic formulation was the only one marketed—women using triphasics were about twice as likely to request abortions as were users of combined pills (259). Finally, a 6-month clinical trial conducted in 11 centers in Denmark, Norway, and Sweden reported three pregnancies in 1,063 cycles among women using the formulation, two of the pregnancies attributed to pill failure (101).

Maternal and child health. By preventing unwanted pregnancies and enabling women to time births, OCs—like other reliable methods of contraception—contribute to both maternal and child health. Worldwide, an estimated half a million women die in pregnancy and childbirth every year. About 99 percent of these deaths occur in developing countries, where, excepting China, on average 550 women die per 100,000 live births, or one for every 180 live births (422). Among children, as many as 20 percent of infants die in parts of Africa and Asia. Worldwide each year an estimated 14 million children die before age five (174).

The number of maternal and child deaths in developing countries could be significantly reduced if more women avoided especially risky pregnancies. High-risk pregnancies are those characterized as too early (before age 18), too late (after age 35), too many (after four births), or too close together (less than two years apart) (see **Population Reports**, *Healthier Mothers and Children Through Family Planning*, J-27, May-June 1984). It has been estimated that avoiding these high-risk pregnancies would prevent two-fifths of maternal deaths. Nearly six million infant deaths might also be avoided by preventing high-risk pregnancies (402).

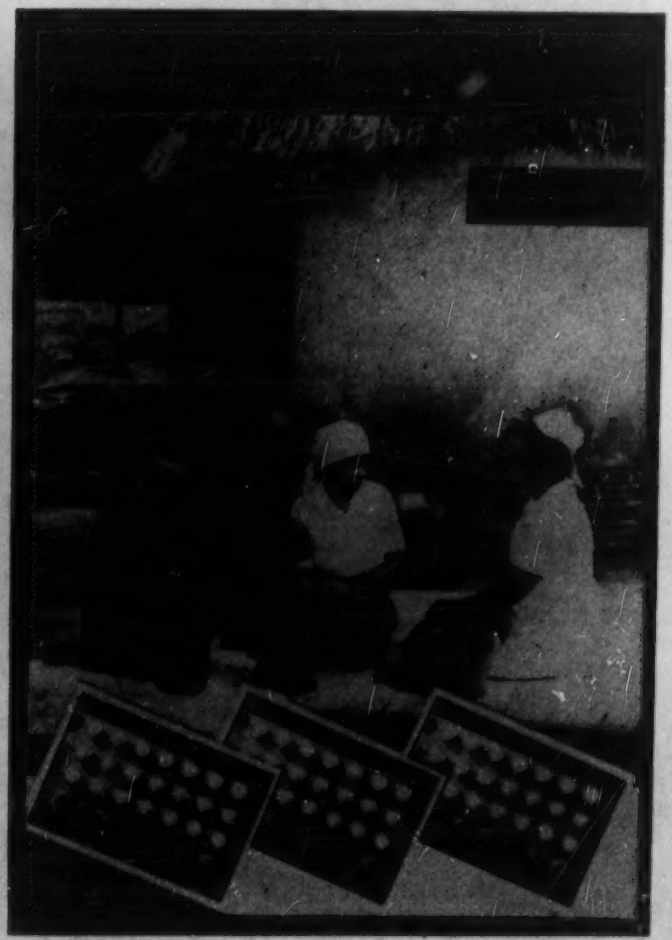

More and more Women are saying 'Yes' to the pill
Use the pill.
Visit your family planning clinic or health centre for advice.
Take control of life before life controls you

A poster from the Caribbean Family Planning Affiliation urges women to find out about oral contraceptives. Public information campaigns that mention specific family planning methods can heighten awareness of and encourage the use of family planning.

Ectopic pregnancy. OCs—and other contraceptives that prevent ovulation—also prevent almost all ectopic pregnancies (110, 354). Ectopic pregnancy, which occurs when a fertilized ovum develops outside the uterine cavity, is a life-threatening condition requiring surgery. It also causes infertility in perhaps as many as two-thirds of women who survive (262). Since all types of OCs are highly effective methods of preventing ovulation, protection against ectopic pregnancy is an important benefit for all women who take the pill.

Because OCs prevent ovulation, they presumably protect against trophoblastic disease, including molar pregnancy and choriocarcinoma. These potentially fatal diseases involve abnormal cellular growth developing from the fertilized ovum.

Pelvic inflammatory disease. Women who use OCs face about half the risk of developing pelvic inflammatory disease (PID) that nonusers face (128, 132, 136, 355). OCs probably reduce the risk of PID by thickening cervical mucus, thus hindering the ascent of pelvic infection (257, 533). PID, an infection often starting in the cervix and then ascending to the upper reproductive tract, is a major cause of fallopian tube blockage leading to permanent infertility.



Combined oral contraceptives (COC) are distributed in Zimbabwe in a household delivery program—as pictured on the cover of this booklet for clients from the Zimbabwe National Family Planning Council. Zimbabwe has the highest rate of contraceptive use in sub-Saharan Africa—43 percent—and 85 percent of women using a modern family planning method use oral contraceptives.

It is clear that OCs protect against PID severe enough to require hospitalization. Such severe PID may be caused mostly by gonorrhea. Most studies of OCs and PID have involved hospitalized cases, however, and have not employed strict diagnostic criteria. Therefore it is uncertain whether OCs protect against less severe infections as well. A large proportion of milder infections may be caused by *Chlamydia trachomatis*. While less likely to produce symptoms, chlamydial PID may be equally or more likely to cause infertility (136, 521) (see pp. 25–26).

Menstrual Benefits

The menstrual benefits of OCs were among the first recognized (418). These benefits include:

- Less iron-deficiency anemia due to lighter menstrual bleeding,
- Less dysmenorrhea, and
- Less premenstrual syndrome.

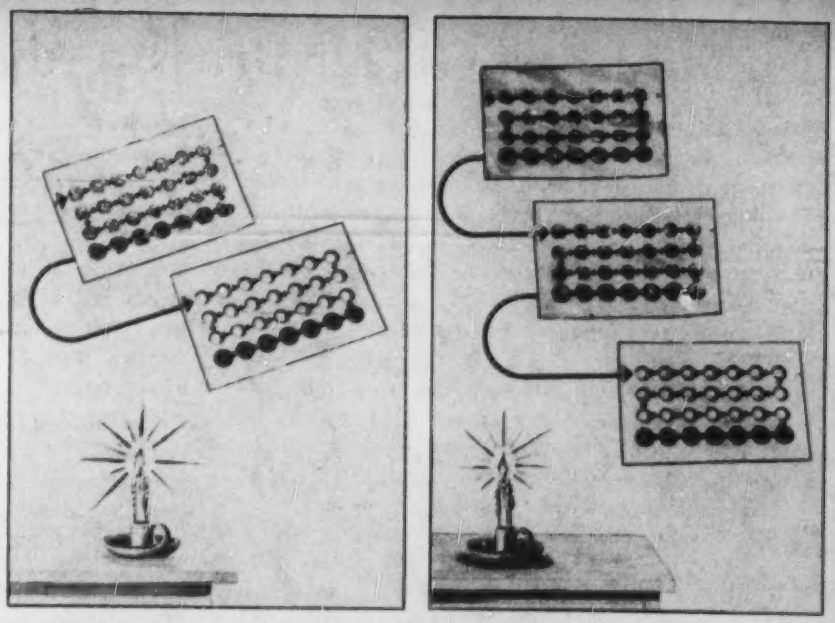
Iron-deficiency anemia. Because OC users' menstrual flow is reduced, OC users may lose only one-third to one-half the blood iron lost by other women during menstruation. Thus OC users are less likely to develop iron-deficiency anemia (154, 343). In developing countries anemia is a serious health problem among women because of inadequate diet, parasitic infections, and the strain of repeated pregnancies. As many as half of women of reproductive age in developing countries may have subnormal levels of hemoglobin, the iron-containing pigment of red blood cells (537).

Some 60 to 80 percent of women who use OCs bleed less heavily during menstruation and lose less blood per cycle than other women (154, 314, 399). A recent US study found a significantly shorter duration of menstrual bleeding, less menstrual blood loss, and higher blood iron levels among OC users than among nonusers. Half of OC users reported light menstrual flow, compared with only 11 percent of other women (154). Taking iron-containing pills as placebos during each cycle may also help. A study of Mexican women with anemia found that both hemoglobin and serum iron levels increased significantly after one year of OC cycles consisting of low-estrogen combined pills for 21 days followed by iron-containing pills for 7 days (403).

Dysmenorrhea. OCs are highly effective in relieving dysmenorrhea (pelvic pain during menstruation). About half of all women experience dysmenorrhea at some time in their lives, and for about 10 percent the pain is severe enough to interfere with daily life (93, 247). As many as 90 percent of affected women experience significant relief from symptoms when they use OCs (107). The Royal College of General Practitioners (RCGP) Oral Contraception Study in the UK found that reports of dysmenorrhea were 63 percent less common among OC users than among nonusers (418). In fact, OCs are a standard treatment for menstrual pain when it is severe enough to interfere with normal activities (436, 526). Pharmacologic studies suggest that OCs relieve dysmenorrhea by inhibiting prostaglandin production. They also suggest that combined OCs are more effective than progestin-only pills (75, 526). It is not yet clear whether current low-dose OCs will prove to be as effective in preventing dysmenorrhea as higher-dose formulations.

Premenstrual syndrome. Several studies have found less severe premenstrual symptoms among OC users than among other women (102, 269, 330, 358, 445). Differences in

defining and measuring symptoms make it difficult to quantify the benefit or to compare the effects of different formulations, however (19, 301, 526). Premenstrual syndrome—feelings of nervousness, irritability, emotional instability, and depression that occur in the 7 to 10 days before menstruation—causes much discomfort to some women of childbearing age (436, 526). Most women experience noticeable premenstrual symptoms at some time, although only 10 percent or less report severe discomfort (242).



Starting the next cycle of pills correctly is important to assure maximum effectiveness. In a pamphlet for nonliterate women, arrows show how to start new 28-pill cycles. PIACT de Mexico prepared this pamphlet for Mexican family planning organizations.

Protection from Cancer

Oral contraceptives protect women from two cancers of the reproductive organs:

- Endometrial cancer and
- Epithelial ovarian cancer.

Studies in the US and UK suggest that these cancers are about half as frequent among users of OCs as they are among other women.

Combined OCs probably protect against these cancers by reducing the rate of cell division. In the case of endometrial cancer, the progestin component in the pill is thought to counteract the effects of estrogen, which would otherwise encourage cell division. Epithelial ovarian cancer, in contrast, is not directly stimulated by estrogen. OCs most likely protect against it indirectly, by preventing repeated ovulation, which damages the surface of the ovaries and requires a greatly increased rate of cell division to repair the damage (71, 372).

Endometrial cancer. Even as little as one year's use of combined OCs cuts the risk of endometrial cancer in half. This is a finding of the US Centers for Disease Control's Cancer and Steroid Hormone (CASH) study, the largest study to date on endometrial cancer and OCs (69, 405). Earlier, smaller studies also reported that OCs provide substantial protection against endometrial cancer (201, 220, 251, 256, 386, 392, 525).

The protection against endometrial cancer lasts long after women stop using OCs. The CASH study found that protection lasted at least 15 years (69), while earlier studies reported protection lasting from 3 to at least 10 years (201, 220, 251, 525).

It is uncertain whether the degree of protection varies with estrogen and/or progestin dose. Although the number of women using any one formulation in the CASH study was too small to allow an analysis by formulation, both high- and low-dose pills had a protective effect (69).

Ovarian cancer. The CASH study and many earlier, smaller studies show that combined OCs protect against epithelial ovarian cancer (20, 68, 71, 97, 206, 305, 342, 406, 415, 490, 524, 528). In the CASH study women who used OCs even for just three to six months reduced their risk of this cancer by 40 percent. Risk decreased further with longer use. Women using OCs for 10 years or more reduced their risk by 80 percent (68, 406).

The CASH study also found that protection against epithelial ovarian cancer persists long after women stop using OCs. Even women who had stopped using OCs 15 or more years previously faced half the risk that never-users faced. Each of the 11 pills studied offered similar protection, whether the formulation was high- or low-dose (68, 406).

The protective effect of OCs against epithelial ovarian cancer may grow in importance in the coming years. All studies to date have looked at women younger than 55, the age group that includes most OC users. Since ovarian cancer is more common in women over age 60, and since protection apparently persists for many years, widespread OC use may eventually result in a dramatic decline in the incidence of this frequently fatal disease (68, 245).

Other Benefits

Additional noncontraceptive benefits of OCs include protection against:

- Benign breast disease and
- Ovarian cysts.

Benign breast disease. OC use lowers the risk of fibroadenoma and fibrocystic breast disease by one-half to three-quarters (55, 351, 420). It has been estimated that in the US in the 1970s OC use prevented more than 23,000 surgeries for benign breast disease per year (257).

Protection against benign breast disease may depend on the progestin content of the pill, with more progestin offering more protection. The Oxford University/Family Planning Association (Oxford/FPA) cohort study compared women using pills with the same amount of estrogen but different amounts of the same progestin. Women using pills containing 2.5 or 3.0 mg norethindrone acetate had half the incidence of fibrocystic breast disease that women who used pills with 1.0 mg norethindrone acetate did (55). Since most pills now in use contain lower amounts of progestin, future studies may show a decrease in protection against benign

Minipill Best OC for Breastfeeding Women

Postpartum women have little need of contraception for up to six months after giving birth if they have not resumed menstruating since giving birth and they give their babies very little or no food other than breastmilk. For breastfeeding women who have menstruated, however, progestin-only pills, or "minipills," are the best oral contraceptive. In contrast to combined pills, there is no risk that minipills will inhibit lactation. Postpartum women using minipills can fully breastfeed. In fact, they may benefit from the contraceptive protection of lactation longer than women using combined OCs. Because of these advantages, the US Agency for International Development recommends minipills for breastfeeding women who choose OCs and has joined other donor agencies in offering them in its assistance program.

Why Progestin-Only Pills?

Postpartum women should and often want to delay another pregnancy. Intrauterine and barrier methods offer good postpartum contraception with no effect on lactation. Many women, however, prefer and request OCs (409, 470). If providers will not give pills to breastfeeding women because they are concerned that pills will inhibit lactation, some women may stop breastfeeding in order to obtain OCs (28).

Minipills are a better solution. They have no adverse effects on lactation. Most research has found that they have either positive effects—increasing milk quantity or improving its nutritional quality—or no effect (222, 264, 304). Their main disadvantage—higher pregnancy rates than combined pills—is offset in breastfeeding women. During breastfeeding ovulation may be irregular even if menstruation has resumed. Also, bleeding irregularities that may accompany minipill use may cause less concern to postpartum women than to others (29).

With combined OCs milk volume usually decreases, even when estrogen doses are low (28, 222, 264, 304, 547, 548). Breast milk composition may change, too, although findings vary. Most studies report decreases in mineral content (222, 264, 304).

These effects do not seem to harm infants. A number of studies report no effects on infant weight gain despite reduced milk volume (2, 66, 217, 544, 547). Studies in Chile reported slower infant weight gain but no adverse effects on infant health (100, 108, 365). The longest follow-up study has found no effects on the health or the physical, intellectual, or psychological development through age eight of Swedish children whose mothers used combined OCs while nursing (345).

Changes in breastfeeding patterns and lactational infertility are a greater cause for concern. If OCs suppress milk production, a woman may begin to supplement her baby's diet with other foods. The infant then will want to nurse less often. Frequent suckling stimulates lactation, which inhibits ovulation (77, 239). Therefore, less frequent suckling may lead to ovulation sooner than if the woman had not started OCs. Unless she continues using reliable contraception, another pregnancy can occur. This has been a problem especially in Bangladesh, where two years of lactational amenorrhea are common. Lactating women who started combined OCs sometimes stopped breastfeeding because their milk supply diminished. They stopped their OCs after only a few months. Then they faced a greater risk of pregnancy than if they had continued to breastfeed (43, 272, 446).

Because minipills do not affect a mother's milk supply, they do not pose these risks. The breastfeeding patterns of minipill users compare favorably with those of combined-pill users. In one study 83 percent of minipill users breastfed for four months or longer compared with 40 percent of combined OC users (95). More importantly, women using minipills breastfeed as long as women using no contraception or a method other than pills (42, 303, 527, 557).

When to Begin?

When can breastfeeding women begin to use minipills? Most family planning programs prefer not to offer any hormonal contraception in the early postpartum months. This is because trace amounts of OC hormones—usually less than one-tenth of one percent of maternal doses—can reach infants in breast milk. These pose no apparent health risks. In principle, however, it is safest not to expose infants to hormones in the first three or four months of development, when they are most susceptible (188, 232, 275, 344, 548).

Also, as noted, providing fully breastfeeding women with OCs for early postpartum use is not necessary. Participants in a 1988 international conference in Bellagio, Italy, concluded that breastfeeding is more than 98 percent effective in protecting against pregnancy as long as a mother is: (1) in the first six months postpartum and (2) still amenorrheic (35, 258). This is a better rate than typical OC effectiveness in developing countries (see p. 13). A program can of course provide a woman with pills immediately postpartum, with instructions about when to start them, if contacting her later would be difficult.

The decision about when to introduce minipills during lactation should be influenced largely by programmatic considerations and the breastfeeding patterns of the particular population. As the Bellagio conferees noted, this may mean when menstruation returns or at six months postpartum, whichever comes first (35). Where lengthy lactational amenorrhea is common, programs might offer contraceptive methods several months before the average time that postpartum women resume menstruating. For example, if menses return on average at 18 months, programs might make minipills available at 12 months (548). Women who choose minipills can then use them and continue to breastfeed until lactation naturally stops.

breast disease (41, 282). The Oxford/FPA study also reported that protection increased with length of pill use (55).

Ovarian cysts. Several studies indicate that OC use protects women from functional (corpus luteum and follicular) ovarian cysts (350, 418, 502). Although these cysts are benign and usually disappear without treatment, some may rupture if not removed (336). The Oxford/FPA study found that the risk of follicular ovarian cysts in current OC users was about half that in users of other contraceptive methods. The protection from corpus luteum cysts was much greater. Users of combined OCs faced about one-fifth the risk that other women faced (503).

Low-dose combined and multiphasic OCs, even though they effectively prevent ovulation, may permit some follicular development and thus offer less protection against cysts. One small study suggests that some low-dose combined OCs may suppress follicle-stimulating hormone less effectively than pills containing 50 µg estrogen (565). Another small study suggests that the same may be true of multiphasics (157). Finally, in the US recent case reports of cysts in women using multiphasic OCs have raised concerns (62, 63). Hospitalizations for ovarian cysts in the US do not appear to have increased with the use of multiphasic pills, however, as would be expected if multiphasics offered substantially less protection or even increased the risk (177).

Health Risks of Oral Contraceptives

Certain circulatory system diseases—mainly thromboembolism but also stroke and heart disease—are the major established health risks of oral contraceptives. For OC users who do not smoke or have other risk factors for circulatory system disease, the risks are small, however, and they appear to be minimized by the low doses in today's pills. For most women the health risks of childbearing are much greater.

OCs also can cause increases in blood pressure, possibly leading to high blood pressure, or hypertension, in some women. Other OC-related health risks include gallbladder disease in women already disposed to it, a very rare form of liver cancer, and noncancerous liver tumors. In addition, pill users and providers must be aware of possible interactions between OCs and other drugs that a woman might be taking.

■

Circulatory System Diseases

Circulatory system diseases were first suspected as risks of oral contraceptive use in the 1960s. By the mid-1970s research involving women using the higher OC doses of the time showed increased risks of thromboembolic disorders, stroke, and heart disease. Except for thromboembolism these risks were concentrated in older OC users who smoked or who had other risk factors for these conditions. There is now evidence that lower doses carry less risk. Precise estimates of the risk—if any—cannot be made, however, because low-dose OCs have not been studied as thoroughly as the higher-dose pills of the 1960s and 1970s. There is no evidence that low-dose pill users older than 35 who do not smoke or have other risk factors for circulatory system disease face higher risks of stroke and heart attack than younger users (325). Medical supervision for older users remains desirable, however (145).

Thromboembolism. A thromboembolism is an obstruction of a blood vessel caused by a blood clot. The most common thromboembolic disorders in OC users are clots that form in leg veins (venous, or deep vein, thrombosis). These sometimes circulate to the lungs, where they can become potentially fatal pulmonary embolisms.

The first US and British case-control studies in the late 1960s, involving women using mostly pills with more than 50 µg estrogen, found that the risk of thromboembolic disorders was 4.4 to 9 times greater for these OC users than for nonusers (428, 469, 507, 508). Later, the Oxford University/Family Planning Association (Oxford/FPA), Royal College of General Practitioners (RCGP), and Walnut Creek cohort studies found risks 2.4 to 7 times greater for current OC users. None reported that elevated risks persisted after women stopped using OCs (370, 421, 502).

Deep vein thrombosis and pulmonary embolism are uncommon in healthy women, however, even if they use OCs. Data from the early studies suggested 110 cases per 100,000 OC users per year, compared with 30 cases per 100,000 women not using OCs. Thus 80 cases per 100,000 women per year (or one additional case per year in every 1,250 users) were attributed to the high-dose OCs (457).

Lower estrogen doses may pose less risk of thromboembolism. The Puget Sound cohort study in the US followed 65,000 women from 1977 to 1982. Over this period use of low-dose pills rose from 16 to 39 percent of OCs prescribed. Meanwhile, users' relative risk of thromboembolism, compared with nonusers, dropped from 8.3 to 2.8. At the same time, providers may have begun screening potential OC users more carefully (381, 382, 383). A recent case-control study did not find reduced risks with lower estrogen doses, but it may have been too small to do so (199).

Some laboratory research also suggests that less estrogen means lower risks of thromboembolism. In some studies low-estrogen pills have less effect on blood clotting and anticlotting factors than pills with 50 µg estrogen (160, 172, 234, 426). The specific relationship between these factors and thromboembolic disease is not clear, however.

Stroke. Cerebrovascular disease, or stroke, occurs in two forms. Thrombotic stroke occurs when the flow of blood in the brain is blocked. Hemorrhagic stroke occurs when a vessel in the brain ruptures. Subarachnoid hemorrhage, in which bleeding from the ruptured vessel enters the space below the brain's arachnoid membrane and spreads through cerebrospinal fluid passageways, is the most common stroke in women of reproductive age. It is more likely to be fatal than thrombotic stroke (289, 290, 458).

The first reports in the 1960s and 1970s suggested about a five times greater risk of any type of stroke among OC users (91, 226, 240, 278, 279, 369, 392, 458, 502). Risks appeared somewhat higher for hemorrhagic stroke than for thrombotic stroke (278, 369, 392). Relative risks for both types of stroke were especially high in OC users who smoked cigarettes (91, 369, 392). Some findings suggested elevated risk of hemorrhagic stroke for both current and former OC users, but elevated risk for thrombotic stroke was confined to current users (458).

If OC users faced five times greater risk of stroke than nonusers, 37 OC-attributed strokes per 100,000 current users could be expected in a year. Two to four of these were likely to be fatal. The vast majority were likely to occur in

users over age 35 because the incidence of stroke increases markedly after that age (458).

More recently, some studies have not found elevated risk of stroke in OC users. In the 1980s two US studies—also involving women using mostly OCs with 50 µg estrogen or more—have reported no increased stroke risks. The Puget Sound study found no risks in either current or former users (381, 382). The Nurses' Health Study reported on former users only (464). These studies did not analyze thrombotic and hemorrhagic stroke separately, nor did they look at smoking habits. In the UK, meanwhile, the Oxford/FPA study found that the relative risk of stroke appeared to drop as the study gathered more data. In 1984 it reported relative risks of 1.5 to 2.0 for subarachnoid hemorrhage and 2.3 to 3.2 for other types of stroke (510), down from 5.0 for all types in 1976 (502).

There is little information on stroke risks with low-dose OCs. The 1984 Oxford/FPA report noted there had been no cases of stroke in 9,100 woman-years among users of pills with less than 50 µg estrogen, compared with 13 in 39,400 woman-years of use of pills with more estrogen. The researchers called these numbers "encouraging but too few to be conclusive" (510). Rates have changed little since then (500).

How OCs might contribute to stroke is not clear. Estrogen effects on blood clotting could be involved (289, 290, 458, 505). Lower estrogen doses would presumably reduce any such risk. Hypertension is a major risk factor for subarachnoid hemorrhage, and low-dose pills may reduce the incidence of OC-related high blood pressure (226) (see below).

Progestins could also be involved. Studies comparing different doses of the same progestins combined with the same dose of the same estrogen have found that stroke rates are lower with lower progestin doses (152, 253, 312, 313). Progestins might contribute to hemorrhagic stroke risk by lowering blood levels of high-density lipoprotein (HDL) cholesterol, a form of cholesterol that reduces risk of atherosclerosis (505, 555).

Heart attack. Ischemic heart disease occurs when an impediment to circulation deprives the heart of an adequate blood supply. Myocardial infarction, or heart attack, is the resulting death of heart muscle cells. Ischemic heart disease can develop gradually from atherosclerosis, in which deposits on the walls of arteries restrict blood flow to the heart muscle, or it can occur because a thrombus, or clot, blocks the coronary arteries.

Early case-control studies found that the risk of myocardial infarction in current OC users was two to four times greater than in nonusers (297, 449). Of the cohort studies, the Royal College of General Practitioners study reported relative risks in current OC users of 3.9 for fatal ischemic heart disease (278). The US Nurses' Health Study reported a relative risk of 2.5 for fatal and nonfatal conditions combined (464).

If OCs increased risk of heart attack about threefold for women under 40, an estimated seven heart attacks attributable to OCs would occur per 100,000 users per year. Among women over 40, the number would be about 67 per 100,000 (458). These estimates are based on early British studies of women using mostly higher doses.

Some studies have found an elevated risk of myocardial infarction only in specific subgroups of OC users (267, 392). Combining OC use with other risk factors for heart disease, such as hypertension and diabetes, raises risks further (298). In particular, heart attack risks increase dramatically in pill users who smoke (162). A recent case-control analysis of data from the Royal College of General Practitioners cohort study found:

- No increased risk of myocardial infarction among current OC users compared with nonusers if neither group smoked,
- A relative risk of 3.5 for OC users smoking fewer than 15 cigarettes a day, and
- A relative risk of nearly 21 for OC users smoking 15 or more cigarettes a day (98).

In other studies OC users who smoked 25 or more cigarettes a day faced a risk of heart disease 23 times greater than nonsmoking OC users (413) and 39 times greater than women who neither smoked nor used OCs (439).

Findings have varied concerning whether heart disease risk increases with the duration of OC use, whether increased risk persists after a woman stops OCs, and, if so, whether this risk declines with time since stopping. With one exception (297), studies have found no relationship to duration of use in current users (439, 449, 464). Among former OC users one US study found that women who used OCs for less than five years faced no increased risk, but those who had taken OCs for more than 10 years faced a relative risk of 2.5 (449). More recently, however, the US Nurses' Health Study reported no elevated risk among former users after nearly 500,000 woman-years of observation. The study also found no link between heart attack risk and time since use (464).

A possible explanation for these contradictory findings is that the estrogen-related risks of thrombosis may disappear after OC use stops, whereas the risks of atherosclerosis may persist. This is because atherosclerosis is a chronic condition that can take years to result in clinical heart disease. Its development is facilitated by high levels of low-density lipoprotein (LDL) cholesterol in the blood, while high levels of high-density lipoprotein (HDL) cholesterol protect against it (167, 270). Estrogens and progestins used in OCs may affect HDL and LDL cholesterol levels in opposite ways, and some progestins may have more effects than others. To put it simply, estrogens appear to increase HDL cholesterol levels, which should reduce the risk of atherosclerosis. In contrast, most progestins appear to lower HDL levels and thus to counterbalance the estrogen effect. Some progestins also seem to raise LDL levels (49, 58, 145, 150, 168, 192, 366, 483, 517, 543, 553, 554, 555). It is not yet known how such changes in cholesterol levels are related to circulatory system disease in OC users.

Increased blood pressure and hypertension. Many studies have observed small but significant blood pressure increases in women taking OCs. In some women these increases are enough to lead to a diagnosis of hypertension. Usually blood pressure remains within normal ranges, however, and declines again after OC use stops (64, 137, 138, 260, 523). One large study of US black women did not find blood pressure increases in OC users that differed significantly from changes in nonusers (45).

The early large studies of OC use suggested that blood pressure increases resulted in a 1.5 to 3 times higher risk of hypertension (blood pressure of 140/90 mm Hg or higher) in OC users than nonusers (137, 418). The risks were concentrated in those who used OCs with progestin doses of 2 mg or more—a very high dose—for five years or more (418). Both estrogens and progestins apparently affect blood pressure, with lowest doses having the least effect. Since

hypertension is an important risk factor for stroke (289), women who know that they have high blood pressure probably should use OCs only if no other contraceptive method is available.

Carbohydrate metabolism and diabetes. OCs affect carbohydrate metabolism in two different ways. Estrogen increases glucose levels and suppresses the insulin response to them. The higher the dose, the more the effect (551). Progestins can stimulate overproduction of insulin, a suspected risk factor for atherosclerosis (99, 551, 552).

In low-dose OC users with initially normal blood sugar levels, these responses seldom exceed normal levels. They face no apparent risk of developing diabetes (149).

Diabetics, whose insulin response to increases in glucose is already suppressed, also may be able to use low-dose OCs if they can see a doctor often. If they are insulin-dependent, their insulin requirement may increase, although with low-dose pills this does not appear to happen often (56). Diabetics are already at elevated risk of circulatory system disease, however, and metabolic effects of OC use may increase this risk further. Thus women with diabetes, a history of diabetes during pregnancy, or a family history of diabetes should use OCs only under medical supervision (56, 184, 195, 248, 287).

Other Conditions

OCs have also been associated with gallbladder disease, liver cancer, and noncancerous liver tumors.

Gallbladder disease. OCs were once thought to cause gallbladder disease, or gallstones. Instead, they probably accelerate the development of gallstones in women already susceptible to them. Gallstones are caused by abnormally high saturation of bile with cholesterol. Cholesterol saturation is higher in OC users than in nonusers, possibly because of estrogen (450, 530). After finding a higher risk during the early years of OC use, the major cohort studies have not detected any elevated risks among long-term OC users. This suggests an acceleration effect in women with already high cholesterol saturation (392, 530).

Liver cancer. Three case-control studies in the US and UK in the 1980s have detected increased risks of liver cancer in long-term OC users (141, 202, 341). For women using OCs eight years or more and with no past history of hepatitis B infection, the studies detected relative risks from about 7 to 20. Liver cancer is nonetheless an extremely rare condition in OC users in developed countries, where one liver cancer fatality per 100,000 long-term users per year might be expected (8).

It is unclear how these findings apply to developing countries. Hepatitis B is a risk factor for liver cancer and is much more common in developing than in developed countries. If there is no interaction between hepatitis B and OCs to increase the risk of liver cancer, the number of additional cases attributable to OCs is likely to be very small. This issue needs to be studied.

Noncancerous liver tumors (hepatocellular adenomas). Hepatocellular adenomas are more common in OC users than in nonusers. Nonetheless, they are quite rare. Their incidence increases with higher estrogen dose and longer OC use. Studies of women using high-estrogen pills in the 1970s estimated that three cases attributable to OCs would occur per 100,000 users per year. With low-dose OCs, this figure is presumably even lower. Ruptured tumors cause internal bleeding that can be fatal. They require immediate surgery (166, 412).

"Don't forget!" says a woman pictured in this Indonesian pamphlet for pill users (top panel). "Forgot? Take a pill immediately. Then take a pill that night as usual." Because many women forget pills, reminders like this are important. The private family planning organization Yayasan Kusuma Buana (YKB) prepared this pamphlet.

Drug Interactions

Contraceptive hormones can interact with certain other drugs that an OC user may take, reducing the effectiveness of OCs or changing the effects of the other drugs. Pregnancies and breakthrough bleeding due to interference with contraceptive hormones have been reported in OC users taking:

- Anticonvulsant and antidepressant drugs including barbiturates, phenytoin, primidone, carbamazepine, and ethosuximide;
- The antitubercular antibiotic rifampicin; and
- The antifungal drug griseofulvin.

Although some anecdotal evidence has suggested that common antibiotics such as ampicillin and tetracycline might also interfere with OC effectiveness, an association has not been clearly established (27, 32, 185, 393, 404, 442, 443, 475).

If a low-dose OC user is using any of these drugs and wants to increase her contraceptive protection, she can use a back-up method of contraception while continuing with her daily pill, she can take two pills a day, or she can change to

Oral Contraceptives and AIDS: No Link Established

Oral contraceptives do not prevent acquired immune deficiency syndrome (AIDS). OC users who are at risk of sexual exposure to the AIDS-causing human immunodeficiency virus (HIV) should insist that their sexual partners use condoms. But do OCs increase the chance of being infected with HIV? One study reached that conclusion, but others since have found no evidence of any increased risk with OC use. Both the International Planned Parenthood Federation (IPPF) and the World Health Organization (WHO) have advised against changing OC policies because of AIDS (438, 546).

Most Studies Find No Link

A 1987 study in Nairobi, Kenya, first raised questions about OCs and HIV infection. Some 115 prostitutes who were not infected with HIV were followed for two years. At that point 80 percent of those who had used OCs at any time in their lives had developed antibodies to HIV compared with 58 percent of those who had never used OCs (380).

Subsequent research has not confirmed the Nairobi finding. Studies of prostitutes in Rwanda, the US, Zambia, and Zaire have found that OC use did not increase the risk of HIV infection (70, 104, 208). These studies were cross-sectional. They did not follow women for a period of time, as the Nairobi study did. A US study, however, did follow the sexual partners of HIV-positive hemophiliacs for one year and found no relationship between oral contraceptive use and the chances of becoming infected with HIV (161).

Questions have been raised about the Nairobi study itself. Others' analyses of the data yield different risk estimates, some of only borderline significance (380, 441, 494, 538). Also, a number of sampling biases could have influenced the study's findings (316, 441). In addition, close to 200 women started the study, but 80 dropped out before it finished, a high loss to follow-up (316).

Further Research

Although most studies find no link between OCs and HIV infection, further research would be useful. As a WHO experts' meeting urged in 1987, two areas deserve attention: (1) OC users' susceptibility to HIV infection and (2) the infectiousness of OC users already carrying the virus (538, 546).

Susceptibility. There are theoretical arguments both that OCs might increase a user's susceptibility to HIV infection and that they might decrease it. On one hand, the mucosal surface of the cervix increases in size with OC use, thus enlarging an area possibly susceptible to HIV infection (380, 518). On the other hand, OCs might make a woman less susceptible if thickened cervical mucus keeps the virus from entering her upper reproductive tract (538). Also, OCs have a wide variety of effects on the immune system. It is not clear whether these effects would influence susceptibility to HIV infection (189).

Infectiousness. Hypothetically, OCs could alter the infectiousness of an already infected woman, depending on whether or not HIV can be transmitted in menstrual blood. If menstrual blood were a transmission route, combined OCs, which reduce the amount and duration of bleeding, could reduce a woman's infectiousness. But at the same time irregular bleeding, which sometimes accompanies pill use, could increase her partner's exposure to blood during intercourse (189). To date there is no evidence that menstrual blood can transmit the virus, however. Two US studies have found that sexual intercourse during menstruation was not more likely to lead to HIV infection (161, 466).

The WHO experts' meeting also recommended immunologic research into the effects of OCs on HIV-infected women (546). If OCs have no effect on the development of symptoms of HIV infection, they can remain a contraceptive choice for HIV-infected women. Because of the possibility of HIV transmission to a fetus during pregnancy, infected women should use effective contraception.

OCs, AIDS, and Other STDs

Further questions about OC use and AIDS involve other sexually transmitted diseases (STDs). People with a history of STDs face a higher risk of HIV infection than those who have never had an STD (44, 319, 391). Since OC use may increase the risk of chlamydial infection (see p. 25), could it indirectly increase the risk of HIV infection as a result?

Only the Nairobi study has investigated possible links among OCs, chlamydial infection, and HIV infection. It found that OC use combined with a history of chlamydial infection did not raise the risk of HIV infection more than did OC use alone (380). The sexually transmitted diseases that appear to increase the chances of HIV infection are those that produce genital ulcers, such as syphilis and genital herpes, rather than chlamydial infection (65, 104, 105, 139, 140, 175). OCs do not appear to increase a user's chances of acquiring these infections.

Avoiding AIDS and other STDs is an urgent concern for all women. Sexually active women are safest from sexually transmitted infections if they have sexual relations only with one uninfected partner who has had no other sexual partners. Any couple that does not have a long-term, mutually faithful relationship should use condoms. Used at each sexual contact, condoms are the best way—short of abstinence or monogamy—to reduce the risks of transmitting or acquiring AIDS and other STDs. Condoms also protect against pregnancy. OCs can be used for extra contraceptive protection.

an OC with 50 µg estrogen. If she uses the drug for less than a month, she should continue using her back-up method or different pill regimen for a week after stopping the drug. If her cycle of 21 pills ends during this week, she should start the new cycle immediately. If she is on a 28-day pill cycle, she should skip the seven placebos or iron tablets and start a new cycle of pills immediately (185).

Women who must take any of these drugs for a long time, such as epileptics or women being treated for tuberculosis, can increase their contraceptive protection by taking 50 µg estrogen OCs for extended periods without interruption. Taking pills continuously through three 21-day packs, followed by a four-to-five day hormone-free interval will put a woman at a slight risk of ovulation only once every several months. Women on long-term treatments should not return to a normal pill schedule until four weeks after stopping their medication. This might be extended to eight weeks in the case of prolonged barbiturate use (185).

OCs can speed up the metabolism of other drugs. Low-estrogen OCs generally have less effect than high doses. Increased clinical effects have been observed in OC users taking anti-anxiety benzodiazepine drugs, corticosteroids used against inflammations, and theophylline (a drug used for asthma and some circulatory conditions). Thus OC users may require lower doses of these drugs than other women (27, 195, 443).

Unresolved Health Questions

Despite years of research, some questions about OC use and a number of conditions remain unanswered. Foremost among these are questions concerning breast cancer and cervical cancer. A number of recent studies have found increased risks of breast cancer in specifically defined groups of young OC users, but the groups differ from one study to the next, and other studies find no risks. In a number of studies cervical cancer seems to occur somewhat more often in OC users. Differences in sexual behavior may explain much of this, however, since a sexually transmitted virus is now thought to be the main cause of cervical cancer. Possible associations between OC use and chlamydial infection of the cervix and malignant melanoma (a form of skin cancer) also are unclear.

■

Breast Cancer and OCs: Renewed Controversy

Any link between OCs and breast cancer would be important. In most developed countries and many developing countries, breast cancer is the most common cancer in women and a leading cause of death. About one in 11 women in developed countries will eventually develop breast cancer. Although in the developing world cancer of the breast and other cancers are considerably less common, breast cancer is generally the second most common cancer in women after cervical cancer. In some Asian and South American countries incidence rates have been rising rapidly (255, 320). Worldwide, more than 500,000 new cases of breast cancer are reported each year, about 40 percent of them in developing countries (465).

Researchers have looked for a link between OC use and breast cancer risk because naturally occurring ovarian hormones appear to play a role in breast cancer (349, 372, 514). The pituitary hormone prolactin, essential in breast development and lactation, has also been suspected of playing a role (103, 346).

Although attention has focused on certain hormones, in general hormone-dependent processes are rarely sensitive to only one hormone, and few hormones play only a single role (134). Thus, as with the study of all hormonal processes, research on the relationship between breast cancer, oral contraceptives, and behavioral risk factors is complex and difficult (see box, p. 23)

Research on OCs and breast cancer. Studies of breast cancer risk and OCs have been limited largely to women who develop breast cancer before menopause, on the grounds that few long-term OC users have yet reached menopause. Since the late 1960s at least 7 cohort and 25 case-control studies have examined the relationship between OCs and breast cancer. The vast majority of these studies have shown no difference in risk of breast cancer between OC users generally and nonusers (211).

A number of recent studies, however, have reported increased risk in one subgroup or another. Because early first birth or full-term pregnancy protects against breast cancer (263, 294, 339, 373), researchers have looked particularly at young users (386) ever since a 1980 study reported increased risk in women who took OCs before a first full-term pregnancy (357).

Curiously, when these studies find elevated risks, each tends to find them in a different subgroup of young women. Often the studies form a chain, each seeking to replicate the previous one but coming up with a different finding. For example, in the early 1980s a Los Angeles study found an increased risk in early users of "high progestin" OCs (374). The criteria used to classify progestins have been widely questioned, however (471, 474), and two studies that set out to test the Los Angeles findings—one in the US and the other in Britain—could not replicate them. The British study, however, did find increased risk among women who had used OCs for more than four years before first full-term pregnancy (309, 310). Among these women risk was greatest with OCs containing ethinyl estradiol, but only with pills marketed before the early 1970s. The Cancer and Steroid Hormone (CASH) study, a large US case-control study, found no increased risk with "high progestin" OCs (460) or ethinyl estradiol-containing OCs used before first full-term pregnancy and no increased risk for long-term early users (435). In 1986 a joint Swedish and Norwegian study reported increased risk before first full-term pregnancy among Swedish women (317, 318). In the same year a New Zealand study, which set out to test whether early use or use before first full-term pregnancy increased risk, found no significantly increased risk in any category of early users (362). In 1988 another reanalysis of the CASH study found an increased risk in a narrowly defined subgroup—long-term users who were nulliparous and had experienced menarche before age 13 (459). A 1988 update of the British Royal College of General Practitioners cohort study reported increased risk in women age 30–34 and in women with one child but not in nulliparous women (254). Most recently, a large British case-control study found that risk of developing breast cancer before age 36 increased with duration of OC use both before

and after first full-term pregnancy (82), but the CASH study, involving cases occurring up to age 54, found no duration-of-use trend (463). Meanwhile, a smaller US case-control study found no increased breast cancer risk for any group of OC users (241), and the Oxford/FPA study reported no links between OC use and breast cancer among women who were mostly parous and over age 25 when they used OCs (566). (Table 5 summarizes recent findings.)

Two studies have found a significant increase in risk of premenopausal breast cancer for all OC users (322, 397). The first, a recent case-control study by the Boston Drug Epidemiology Unit, found a doubling of breast cancer risk for women under age 45 who had ever used OCs, regardless of length of use (322). This finding is particularly puzzling because a previous study by the same researchers, using identical research methods but a different group of women, did not find an increased overall risk (321). Also, the twofold increase in risk seen with less than three months' OC use seems biologically implausible (322).

The second study, a case-control study conducted in Yugoslavia, found a relative risk of 1.6 for OC users overall. Like many studies of OCs and breast cancer, this research used as controls women hospitalized for other conditions. Significantly more of the controls had been advised by a doctor not to use OCs, and in general the controls were in poorer health than the OC users. Thus they may have been less likely to use OCs. If, as a result, the controls were not representative of the population, the relative risk figure of 1.6 would be an overstatement (397). Bias resulting from selection of hospital-based controls may be a problem in other studies as well (447).

Several other studies have found greater risk with long-term use. For example, the most recent British case-control study found that relative risk rose from none for up to four years of OC use to 1.7 for eight years of use or more. Duration-of-use trends were seen in nulliparous women and in parous women whether they used OCs before first full-term pregnancy or after it. Age at first use of OCs made no significant difference. This study was limited to women who developed breast cancer before age 36. A study involving women whose cancers developed later is underway (82).

Researchers have advanced various explanations for these varied findings. Firm conclusions are not yet possible. One plausible hypothesis is that OC use accelerates the development of premenopausal breast cancer rather than initiating new cases (82, 254, 397, 463). The 1988 RCGP study, for example, offers some evidence of this: while OC users faced a greater risk of breast cancer at ages 30–34, at ages 35-40 OC users faced a decreased risk, although the decrease was not statistically significant (254). Similarly, in the CASH study an apparent increase in risk among nulliparous women age 20–44 was followed by an apparent decrease for nulliparous women age 45–54 (459, 463). Studies restricted to very young women, however, cannot test this hypothesis (463) (see box, p. 23). Of course, even this hypothesis does not explain all the conflicts among the various studies.

Evidence from a different source suggests that OCs have not obviously increased the actual number of breast cancer cases. Breast cancer rates in the US and UK generally do not show trends that would suggest a substantial risk from OC use (82, 367). For example, although breast cancer rates have been rising among young US women, the increase

Table 5. Premenopausal or Early Breast Cancer and Oral Contraceptive Use, Summary of Selected Findings, 1983–1989

● Statistically significant increased risk or trend ◗ Increased risk or trend of borderline statistical significance ○ No increased risk or trend – Not reported . More specific subgroup analyzed

Possible Risk Factor or Group	L&O	LA	L,O &E	F	AN	B-1	B-2	SSw	CASH	NI	Syd	NZ	S&N	CR	Ade	RCGP	Slov	UK	Puget	Ox
Any OC use	○	–	–	–	○	○	●	–	○	○	○	○	–	○	○	○	●	–	○	–
Long-term use	○	●	●	○	○	○	●	○	○	○	○	○	●	○	○	○	●	●	○	○
Use started young	○	.	○	○	–	○	.	●	○	–	○	○	○	○	○	○	○	.	–	○
Long-term use started young	–	.	–	○	–	○	○	–	○	–	–	○	○	–	–	–	–	●	–	–
Use before first birth/ftp	○	.	●	.	○	○	●	–	○	–	○	○	.	–	○	–	–	●	○	○
Long-term use before first birth/ftp	○	–	●	○	–	○	○	–	○	–	–	○	●	–	–	–	–	–	○	–
Use only after first birth/ftp	–	–	○	○	○	○	●	–	–	–	–	–	–	–	–	–	–	●	–	–
Parous	–	–	–	–	–	–	–	–	–	○	–	–	–	–	○	.	–	●	–	–
Para 1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	●	–	–	–	–
Nulliparous	–	–	○	–	○	○	○	–	.	○	–	–	–	–	○	○	–	●	–	–
Long-term use by nulliparas	–	–	–	–	–	–	–	–	.	–	–	–	●	–	–	–	–	–	–	–
Long-term use by nulliparas with menarche before age 13	–	–	–	–	–	–	–	–	●	–	–	–	–	–	–	–	–	–	–	–
Use of "high progestin" OCs	–	.	○	–	–	○	–	–	○	–	–	–	–	–	–	–	–	–	–	○
Long-term use of "high progestin" OCs while young	–	●	–	–	–	○	–	–	○	–	–	–	–	–	–	–	–	–	–	–
Use of OCs containing EE	–	–	.	–	–	–	–	–	○	–	–	–	–	–	–	–	–	–	.	○
Use of OCs containing EE before first ftp	–	–	●	–	–	–	–	–	○	–	–	–	–	–	–	–	–	–	○	–
Age 30–34 or 35–39 at diagnosis	–	–	–	–	–	–	–	–	○	–	–	–	–	○	–	●	●	–	–	–
Current or recent use	–	–	–	–	◗	–	–	–	–	–	○	–	○	–	–	○	●	○	–	–
Past use	–	–	–	–	○	–	–	–	–	–	○	–	–	–	–	○	–	●	–	–
Long time since first use	○	–	–	–	○	○	●	–	○	◗	○	○	○	○	○	●	●	–	–	○
Long time since last use	○	–	–	–	○	○	–	–	○	◗	○	–	○	○	○	●	–	–	–	○
History of benign breast disease	–	–	–	–	–	○	○	–	○	–	–	–	–	–	○	–	–	–	–	–
Family history of breast cancer	○	–	–	–	○	○	○	–	○	–	–	–	–	–	○	–	●	–	–	–

ftp = full-term pregnancy
EE = ethinyl estradiol

L&O London and Oxford study 1980 (301, 512)
LA Los Angeles study 1983 (374)
L,O&E London, Oxford, and Edinburgh study 1987 (309, 310)
F French Multicenter Study 1984 (280)
AN American Nurses' Association cohort study 1984 (285)
B-1 Boston Drug Epidemiology Unit study 1984 (321, 414)
B-2 Boston Drug Epidemiology Unit study 1989 (322)
SSw Southern Sweden study 1985 (384)
CASH Cancer and Steroid Hormone study (US) 1985 (67, 433, 435, 459, 460)
NI Northern Italy study 1986 (271)
Syd Sydney, Australia, study 1986 (124)
NZ New Zealand study 1986 (362)
S&N Swedish and Norwegian Joint National Study 1986 (318)
CR Costa Rica Cancer and Steroid Hormone study 1987 (281)
Ade Adelaide, Australia, study 1988 (411)
RCGP Royal College of General Practitioners study (UK) 1988 (254)
Slov Slovenia, Yugoslovia, study 1988 (397)
UK United Kingdom National Case-Control Study 1989 (82)
Puget Puget Sound study 1989 (241)
Ox Oxford University/Family Planning Association 1989 (500)

Difficulties of Studying Breast Cancer and OCs

Epidemiologic studies of breast cancer and OCs are especially difficult to conduct and to interpret. There are several reasons:

- The factors that influence the development of breast cancer are extremely complicated and poorly understood. It has been estimated that known risk factors explain only about one-fourth of breast cancer cases (255). In epidemiologic studies this lack of basic biological knowledge makes it difficult to identify all possible confounding factors. It also makes it difficult to devise biologically plausible hypotheses that can be tested in such studies or used to help interpret findings (540).
- Cancers often remain undetected for many years—perhaps as long as 15 to 30 years after exposure to the causal agent. This long latent period may mean that useful studies cannot be conducted for many years after exposure and, when they are, people may not remember whether or how long they were exposed.
- Breast cancer risk is related to reproductive behavior—particularly age at first full-term pregnancy. Thus OCs may increase a woman's breast cancer risk simply by delaying first birth. Studies must take this into account.
- Detection bias may distort findings. If OC users, concerned about cancer, have breast examinations more often or check their own breasts more often, or if OC-induced breast changes make tumors easier to feel, they may detect tumors earlier than other women of the same age.
- With a fairly common disease such as breast cancer, many subgroups of women can be analyzed in a single study. Such intense analysis can yield statistically significant associations that arise only by chance (135).
- At the same time, however, because cancer is relatively rare in young women, small but real risks in particular subgroups may go undetected even in large cohort studies (308, 433).
- Many case-control studies select controls from among women who do not have breast cancer but are hospitalized for other reasons. Some of these women might be avoiding OCs because of their illnesses or conditions. If so, they will be less likely to use OCs than women in the general population, and the study results will be biased. Researchers must try to ascertain how well controls represent all women of the same age and marital status.
- OCs have been available only since the 1960s. Therefore few early users have reached menopause, and most studies of OCs and breast cancer have been limited to premenopausal cancer. In case-control studies this has usually been done by choosing only cases occurring before a certain age. If OC use accelerates tumor growth rather than initiates it, cases might occur earlier in users but not more often. If cases in OC users are shifted from after the cutoff age to before it, the relative risk estimate would be exaggerated. The same problem could occur when age groups are analyzed separately.
- Some studies report statistically significant but small relative risks of breast cancer for certain groups of OC users. When a relative risk is close to 1.0, there is a substantial likelihood that the finding is due to bias.

began before OCs were introduced. Most of the increase appears to be due to later first births (367).

What does it mean? In a June 1988 meeting the WHO Task Force on Safety and Efficacy of Fertility Regulating Methods concluded:

- Findings are conflicting;
- No obvious interpretation is available;
- There is a good possibility that as-yet-unidentified methodological flaws explain some of the findings; and
- More research is necessary (542).

Similarly, the Fertility and Maternal Health Drugs Advisory Committee to the US Food and Drug Administration, in a January 1989 meeting, saw no need at this time for any woman to stop using OCs as a result of current information. While endorsing further research, the committee concluded that the data are inconsistent and advised against any changes in US doctors' prescribing practices or in the required labeling in OC packages marketed in the US (16).

In any case, the implications of OCs and breast cancer research may be different for developing countries than for developed countries. The current concern about breast cancer focuses largely on women who use OCs while quite young or before first birth. In developing countries most pill users are older, have already had one or two children, and are using OCs to delay the next birth.

Furthermore, as noted, the underlying risk of developing breast cancer is much less in most developing countries. There are many reasons for this. First, in developing countries women tend to reach menarche later. Even more important, women tend to marry and have a first child earlier than in developed countries. Women also are likely to breastfeed. All of these help to protect against breast cancer (255, 294, 311). Also, in developing countries breast cancer risk does not increase as rapidly with age (535). Finally, less food consumption, especially fat and meat, and less obesity may further minimize breast cancer risk among developing-country women (286). As countries develop, however, the epidemiology of breast cancer may become more like that in developed countries.

The conflicting findings to date provide the impetus for further research. The World Health Organization (WHO) will soon publish results from a 10-country study using hospital controls. Findings also will soon be published from case-control studies in the Netherlands and New Zealand. It is not expected, however, that studies now underway or reanalyses of existing data will explain the differences among findings to date.

Important issues for further research are:

- If an association between OC use and breast cancer is real, does it reflect accelerated development of existing

In the Philippines OC users can receive an illustrated pamphlet (left) from Kabalikat, a family health information, education, and communication organization. Each pamphlet includes an insert for the family planning provider to help review crucial points with the client.

tumors or new, additional cases? Studies of women who develop cancer at older ages may help to answer this question. Whether an increase in cancers at a young age is followed by a compensatory or even greater decrease at older ages deserves investigation.

- Do any risks for premenopausal cancer also apply to postmenopausal cancer, which is roughly 10 times more common? The two types of cancer differ. Tumors in postmenopausal women tend to grow less rapidly and may be more amenable to treatment (6, 204).
- Does dosage make a difference? Even the most recent studies involve mainly women who used OCs many years ago, when doses were higher. The most recent British case-control study observed less risk with low-estrogen pills (82). Continued study will be needed to learn more about low-dose pills (11, 116, 308, 322).

In addition, there is an urgent need for additional studies of all aspects of breast cancer. These studies should look at a wide variety of possible risk factors in breast cancer. At the same time, basic research is needed to clarify underlying disease mechanisms. Such a comprehensive research strategy could yield a very important benefit: A better understanding of breast cancer may make it possible to develop a hormonal treatment that will protect against both pregnancy and breast cancer (1, 371, 372, 384).

■

Cervical Cancer

Epidemiologic studies of OC use and cervical cancer have been inconclusive. Most early studies found no link between OC use and malignant or premalignant cervical neoplasms. Recent research has produced more mixed findings. Interpreting these results is difficult because the biological factors influencing the development of cervical cancer are complex, poorly understood, and difficult to study (211, 218, 261, 534) (see box, p. 25).

Although the sexually transmitted human papillomavirus is probably the primary initiator of cervical cancer, oral contraceptives could conceivably play a secondary role. Theoretically, possible mechanisms include: (1) promotion of tumor growth, (2) changes in cervical mucus that could increase tissue susceptibility, (3) alteration of immune response that increases susceptibility to viral infection, and (4) production of a folate deficiency in the cervix that could stimulate development of abnormal cervical lesions (151, 434). Currently, no firm evidence supports any of these theories. One US study found that precancerous lesions were more likely to progress in OC users (467), but a Yugoslavian study failed to confirm this (559).

Precancerous lesions. Although the overall picture is confusing, most but not all studies of preinvasive cervical lesions have shown some elevated risk in ever-users or long-term users of OCs. The relative risks vary greatly. Most of these studies, however, have not adequately controlled for all possible confounding variables, particularly sexual practices. Finally, even if a link to preinvasive lesions were shown, this would not necessarily prove a link to invasive cancer—that is, cancer that spreads from the surface cell layers to adjacent or distant tissue. Many preinvasive lesions do not become invasive (386, 433).

Invasive cervical cancer. Since 1983 eight studies have looked at the risk of invasive cervical cancer by duration of oral contraceptive use (36, 53, 118, 233, 271, 280, 482, 509). Seven of the eight studies found some increase in risk. Taken together, the results suggest little or no increased risk over the first five years of OC use. They suggest a gradual rise in risk after 5 years, however, to about a twofold difference after 10 years (434).

The specific results of these studies are varied. Typical of studies finding risk in long-term use is a multicenter WHO study reporting a relative risk of about 1.7 among women using OCs for more than five years (482). Similarly, the Royal College of General Practitioners (RCGP) cohort study recently reported a steady increase in risk with duration of use. Women using OCs for more than 10 years had twice the incidence of nonusers (36). One study found an increased risk amounting to 40 percent with less than five years' use (53). In contrast, a case-control study in Costa Rica found no increased risk after seven years of OC use (233).

Like the studies of noninvasive cervical lesions, most studies of OCs and invasive cervical cancer suffer from one or more major methodological shortcoming. One did not account adequately for different frequency of Papanicolau smears between cases and controls (280). Three did not account for use of barrier methods (118, 271, 280). One could not account directly for sexual behavior (509). Two did not control for cigarette smoking (280, 482).

Additional studies, using rigorous means to control possible biases, are needed. It will be particularly important to determine accurately whether or not women have been exposed to viruses that have been linked to cervical cancer (386).

Regardless of how—or whether—the question of OCs and cervical cancer is resolved, where screening services are available, all women should have regular Pap smears. Elsewhere, as women's health services are able to expand, offering Pap smears should be considered. These tests can identify cervical neoplasia at early stages, when treatment is virtually always effective. In addition, for those not in long-term mutually monogamous relationships, condoms provide

Difficulties of Studying Cervical Cancer and OCs

Four major factors complicate the study of OCs and cervical cancer:

- Differences in sexual activity affecting contraceptive practice,
- The natural history of cervical neoplasia,
- Differences in screening for cervical neoplasia, and
- Cigarette smoking.

Each of these can bias the results of epidemiologic studies.

Sexual activity and contraceptive practice. Women who are younger at first intercourse, have multiple sexual partners, or whose male partners have multiple partners face a greater risk of cervical cancer than other women. In contrast, users of barrier contraceptive methods face less risk. These observations suggest that a sexually transmitted agent is involved in the development of cervical cancer. Recent evidence from molecular biology and clinical investigations suggests that infection with some types of genital human papillomavirus is the greatest risk factor. Therefore, to identify persons likely to be infected with this virus, epidemiologic studies of OCs and cervical cancer must take sexual and contraceptive practices into account. If women choose OCs **because** they start sexual activity early or have many partners, studies might find an association between OC use and cervical cancer, but this would not mean that OCs caused this cancer (73, 379). Taking sexual practices into account requires information not only about each woman studied but also about her sexual partner or partners. This information is difficult to obtain and to verify.

Studying the involvement of human papillomavirus is especially difficult. Recently a few types have been linked to cervical cancer. Many types exist, and several are widespread. Some are known to cause genital warts, most of which are benign. The majority of infected persons—perhaps as many as 90 percent or more—show no obvious signs of infection, however (266). Furthermore, these persons may develop cervical cancer without developing visible warts. Finally, screening has little value. Currently available tests probably detect only about half of infections. In addition, these tests do not reliably discriminate among viral types, often indicate infection in uninfected persons, and are expensive. At present, the only practical way to take account of infection with papillomavirus is to obtain detailed lifetime sexual histories from all study participants and their partners, including a history of sexually transmitted disease (13, 266, 276, 400, 437, 539).

Natural history. Unlike other cancers of the female reproductive organs, invasive cervical cancer is preceded by clinically recognizable preinvasive lesions. Cervical cancer is generally thought to progress through four stages. During the first three stages, described as varying degrees of cervical intraepithelial neoplasia (CIN I, II, and III), abnormal tissue develops, but women are generally asymptomatic (244). CIN is easily treatable. Removal or destruction of the abnormal tissue prevents progression to the fourth stage of the disease, invasive cervical cancer. Risk factors for each stage may vary (54). OCs might have an independent effect or might act as a cofactor at any stage. Thus studies should examine each stage separately. Regrettably, many studies have not distinguished among types of lesions. Only recently have well-designed studies begun to focus on invasive cancer (211, 386).

Screening. Compared with women using other contraceptive methods, OC users tend to have more Papanicolau smears to test for cervical cancer and its precursors (73). Thus more cervical neoplasia may be detected among OC users. At the same time, however, lesions may be detected and treated earlier in OC users, so that they would have fewer cases of invasive cancer. Thus prior Pap smears must be considered, but the information is difficult to interpret (73, 386). Variations in the accuracy of Pap smear interpretation may also cause problems, and blind readings—interpretation by people who do not know whether the subject used OCs or not—are necessary (386).

Cigarette smoking. Several studies indicate that cigarette smoking increases the risk of cervical cancer. When other risk factors are controlled, smoking is associated with about a twofold increase in risk (33, 36, 54, 292, 531). One hypothesis is that smoking may depress the immune system, thus increasing susceptibility to sexually transmitted infections (87, 293). At any rate, because various studies in the US and UK have found that OC users are more likely to smoke than other women, controlling for smoking is essential in studies of OCs and cervical cancer.

some protection against the virus thought to cause cervical cancer. Spermicides, which laboratory studies have shown to inactivate some sexually transmitted viruses, may provide additional protection when used with condoms (73).

■

Sexually Transmitted Diseases

The relationships between OC use and sexually transmitted diseases (STDs) are varied and sometimes complex. OC users are possibly at a greater risk of cervical infection with *Chlamydia trachomatis* than nonusers (521). In addition, OC users may have a slightly increased risk of vaginal infection (mainly candidiasis, or yeast infection). OCs do not appear to predispose women to any other STDs. In fact, they protect users against pelvic inflammatory disease (PID) that can develop from STDs (see p. 14).

Relative risks of 1.5 to 3.9 for chlamydial infection have been reported for OC users (521). These figures may be deceiving, however. Because of physiological changes, known as ectopy, in an OC user's cervix, the cervical epithelial cells that are the target cells of *C. trachomatis* are more exposed to the pathogen than in nonusers. This may increase the potential for infection (191, 291). Ectopy also makes specimen col-

lection easier, however, and the appearance of higher risks in OC users might be the result of easier detection (521).

In many studies of OC users and STDs, comparison groups have included women using barrier methods of contraception. These women are protected to varying degrees against STDs. Relative risks for various vaginal infections may be overstated for this reason (50, 418). The two studies of *C. trachomatis* and OC use that have controlled for barrier method use or excluded it from the comparison have obtained differing results, one finding significantly increased risks (291) and one not (191).

If OC users face an increased risk of chlamydial infection, does this increase their risks of chlamydia-related PID and subsequent infertility? Probably not. OCs appear to protect against chlamydial PID, perhaps because an OC user's thick cervical mucus hinders the bacteria's ascent to the upper reproductive tract (485, 533). Also, although epidemiologic studies to date may not cover chlamydial PID adequately (see p. 14), recent studies have not found greater risks of tubal infertility among OC users than among other women (23, 96).

If increased risks of chlamydial infection are real, OC users can still take steps to minimize them. For couples in a mutually faithful sexual relationship, the risk of STD infection is nil. Any OC user—and anyone else—who faces increased risks of STDs because she has had more than one sexual partner—or because her sexual partner may have had other partners—should use condoms.

■

Malignant Melanoma

The US Walnut Creek cohort study reported that OC users developed malignant melanoma, a type of skin cancer, at 3.5 times the rate of nonusers (392). In this study OC users had had significantly more exposure to sunlight than other women. Since exposure to sunlight is the chief risk factor for melanoma, this could explain the increased risk (392).

Most other studies, including the RCGP and Oxford/FPA studies, have not found significant differences in risk (15, 200, 252). Some have noted that relative risks increase with length of OC use, although not significantly (15, 212). One, however, found no risks in women using OCs for five years or more (200). Some of these studies tried to control for exposure to sunlight. Others did not. Future studies need to control carefully for this confounding factor.

While some questions about OCs await answers, the pill continues to be popular for its convenience, effectiveness, and safety. For many women around the world, the pill offered the first feasible way to prevent unwanted pregnancy. For many, it is still the best way.

Bibliography

An asterisk (*) denotes an item that was particularly useful in the preparation of this issue of **Population Reports.**

1. ANONYMOUS. Another look at the pill and breast cancer. Lancet 2(8462): 985–987. Nov. 2, 1985.
2. ANONYMOUS. Children of pill users who breastfeed show no growth deficiencies. International Family Planning Perspectives 8(1): 30–31. Mar. 1982.
3. ANONYMOUS. Dominican Republic 1986: results from the Demographic and Health Survey. Studies in Family Planning 19(2): 122–126. Mar.-Apr. 1988.
4. ANONYMOUS. Funding cuts halt UK pill safety study. IPPF Open File, Aug.-Sep. 15, 1988. p. 19.
5. ANONYMOUS. General discussion [of factors affecting acceptance and compliance in use of oral contraception]. Singapore Journal of Obstetrics and Gynaecology 15(1, Suppl.): 119–123. Mar. 1984.
6. ANONYMOUS. Hormone receptors positive prognostic indicators in breast cancer. Ob.Gyn. News 22(12): 18. Jun. 15–30, 1987.
7. ANONYMOUS. Liberia 1986: results from the Demographic and Health Survey. Studies in Family Planning 19(4): 250–254. Jul.-Aug. 1988.
8. ANONYMOUS. Liver cancer and long-term use of oral contraceptives. British Journal of Family Planning 12(3): 103–104. Oct. 1986.
9. ANONYMOUS. Low-dose oral contraceptives and cardiovascular disease. NIH Guide for Grants and Contracts 18(6): 3. Feb. 24, 1989.
10. ANONYMOUS. Oral contraceptives and breast cancer. Lancet 2(8395): 145. Jul. 21, 1984.
11. ANONYMOUS. Oral contraceptives and breast cancer. Lancet 2(8508): 665–666. Sep. 20, 1986.
12. ANONYMOUS. Oral contraceptives and neoplasia. Lancet 2(8356): 947–948. Oct. 22, 1983.
13. ANONYMOUS. Subclinical penile HPV may be related to partner's cervical ca. Ob.Gyn. News 23(20): 25. Oct. 15–31, 1988.
14. ABDEL-AZIZ, A., ANDERSON, J.E., MORRIS, L., WINGO, P., and SHRYDEH, B. Family planning in Jordan: 1983 survey data. Studies in Family Planning 17(4): 199–206. Jul.-Aug. 1986.
15. ADAM, S.A., SHEAVES, J.K., WRIGHT, N.H., MOSSER, G., HARRIS, R.W., and VESSEY, M.P. A case-control study of the possible association between oral contraceptives and malignant melanoma. British Journal of Cancer 44(1): 45–50. Jul. 1981.
16. ALAN GUTTMACHER INSTITUTE. FDA panel examines link between breast cancer, pill, says more research needed. Washington Memo, W-3: 3–4. Jan. 18, 1989.
17. ALBUQUERQUE, L.A., ALBUQUERQUE, E.G., WASZAK, C.S., ROWAN, A.M., and BARTHLOW, D. A comparative clinical trial of Norinyl 1/35 versus Brevicon in Rio Claro, Brazil. Contraception 38(5): 525–539. Nov. 1988.
18. ALLEN, H.H. Clinical assessment of a low-dose oestrogen, low-dose progestogen combined oral contraceptive. Current Medical Research and Opinion 2(2): 101–108. 1974.
19. ANDERSCH, B. and HAHN, L. Premenstrual complaints: 2. Influence of oral contraceptives. Acta Obstetricia et Gynecologica Scandinavica 60(6): 579–583. 1981.
20. ANNEGERS, J.R., STROM, H., DECKER, D.G., DOCKERTY, M.T., and O'FALLON, W.M. Ovarian cancer: incidence and case control study. Cancer 43(2): 723–729. Feb. 1979.
21. APELO, R. and VELOSO, I. Clinical experience with ethinyl estradiol and d-norgestrel as an oral contraceptive. Fertility and Sterility 26(10): 283–288. Mar. 1975.
22. APELO, R.A. and SUPLIDO, A. Clinical assessment of a new triphasic oral contraceptive. Clinical Therapeutics 8(1): 61–70. 1985.
23. ARAL, S.O., MOSHER, W.D., and CATES, W., Jr. Contraceptive use, pelvic inflammatory disease, and fertility problems among American women: 1982. American College of Obstetrics and Gynecology 157(1): 59–64. Jul. 1987.
24. ARNT, I.C., FERRARI, A., SARTORETTO, J.N., and WOUTERSZ, T.B. Low-dose combination oral contraceptives: a controlled clinical study of three different norgestrel-ethinyl estradiol ratios. Fertility and Sterility 28(5): 549–553. May 1977.
25. ARRUDA, J.M., RUTENBERG, N., MORRIS, L., and FERRAZ, E.A. Pesquisa Nacional sobre Saude Materno-Infantil e Planejamento Familiar Brasil—1986. [Brazil National Survey of Maternal and Child Health and Family Planning—1986.] [POR] Rio de Janeiro and Columbia, Maryland, Sociedade Civil Bem-Estar Familiar no Brasil (BEMFAM), and Institute for Resource Development/Westinghouse, Dec. 1987. 234 p.
26. ARSHAT, H. A comparative study of Loestrin versus Nordette in Kelantan, West Malaysia. Malaysian Journal of Reproductive Health 2(1): 25–31. 1984.
27. BACIEWICZ, A.M. Oral contraceptive drug interactions. Therapeutic Drug Monitoring 7(1): 26–35. Mar. 1985.
28. BADRAOUI, M.H. and ASKALANI, H. Effect of low-dose combined OCs on lactation patterns. Contraceptive Delivery Systems 4(4): 327–329. Sep. 1983.
29. BADRAOUI, M.H.H., HEFNAWI, F., and ASKALANI, H. The value of breast feeding in developing countries (with reference to Islamic population). Population Sciences 4: 17–31. 1983.
30. BALAKRISHNAN, T.R., KROTKI, K., and LAPIERRE-ADAMCYK, E. Contraceptive use in Canada, 1984. Family Planning Perspectives 17(5): 209–215. Sep.-Oct. 1985.
31. BARBADOS FAMILY PLANNING ASSOCIATION (BFPA). Contraceptive Prevalence Surveys: a comparative study of contraceptive prevalence in Antigua, Dominica, St. Lucia and St. Vincent. Bridgetown, Barbados and Columbia, Maryland, BFPA and Westinghouse Health Systems, Sep. 1983. 83 p.
32. BARNETT, M.L. Inhibition of oral contraceptive effectiveness by concurrent antibiotic administration: a review. Journal of Periodontology 56(1): 18–20. Jan. 1985.
33. BARTON, S.E., MADDOX, P.H., JENKINS, D., EDWARDS, R., CUZICK, J., and SINGER, A. Effect of cigarette smoking on cervical epithelial immunity: a mechanism for neoplastic change? Lancet 2(8612): 652–654. Sep. 17, 1988.
34. BASNAYAKE, S., DE SILVA, S.V., MILLER, P.C., and ROGERS, S. A comparison of Norinyl and Brevicon in three sites in Sri Lanka. Contraception 27(5): 453–464. May 1983.
* 35. BELLAGIO CONSENSUS CONFERENCE ON LACTATIONAL INFERTILITY. Consensus statement: breastfeeding as a family planning method. Lancet 2(8621): 1204–1205. Nov. 19, 1988.
36. BERAL, V., HANNAFORD, P., and KAY, C. Oral contraceptive use and malignancies of the genital tract: results from the Royal College of General Practitioners' Oral Contraception Study. Lancet 2(8624): 1331–1335. Dec. 10, 1988.
37. BERENT, J. Family planning in Europe and USA in the 1970s. Voorburg, Netherlands, International Statistical Institute, Oct. 1982. (World Fertility Survey Comparative Studies No. 20) 33 p.
38. BERGER, G.S., EDELMAN, D.A., and TALWAR, P.P. The probability of side effects with Ovral, Norinyl 1/50 and Norlestrin 1. Contraception 20(5): 447–453. Nov. 1979.
39. BERGSTEIN, N.A.M. Clinical efficacy, acceptability and metabolic effects of new low dose combined oral contraceptives. Acta Obstetricia et Gynecologica Scandinavica (Suppl. 54): 51–59. 1976.
40. BERGSTEIN, N.A.M. Investigation of a new low-dose oral contraceptive: 30 micrograms ethinyl estradiol and 150 micrograms levonorgestrel (d-Norgestrel). Clinical Therapeutics 1(1): 26–32. 1977.
41. BERKOWITZ, G., KELSEY, J., HOLFORD, T., and LIVOLSI, V. Exogenous hormone use and fibrocystic breast disease among pre and postmenopausal women. Presented at the 16th Annual Meeting of the Society for Epidemiological Research, Winnipeg, Canada, Jun. 15–17, 1983. 6 p.
42. BETANCOURT, J.D., SANDOVAL, J.C., SANCHEZ, F., VALLESTEROS DE CANO, P.V., LUZ BANTISTA, M. DE LA, and JIMENEZ, F. Influence of Exluton (progestogen-only OC) and the Multiload Cu 250 IUD on lactation. Contraceptive Delivery System 5(2): 91–95. Apr. 1984.
43. BHATIA, S., BECKER, S., and KIM, Y.J. The effect of oral contraceptive acceptance on fertility in the postpartum period. International Journal of Gynaecology and Obstetrics 25(Suppl.): 1–11. 1987.
44. BIGGAR, R.J. The AIDS problem in Africa. Lancet 1(8472): 79–83. Jan. 11, 1986.
45. BLUMENSTEIN, B.A., DOUGLAS, M.B., and HALL, W.D. Blood pressure changes and oral contraceptive use: a study of 2676 black women in the southeastern United States. American Journal of Epidemiology 112(4): 539–552. Oct. 1980.
46. BOOHENE, E. and DOW, T.E., Jr. Contraceptive prevalence and family planning program effort in Zimbabwe. International Family Planning Perspectives 13(1): 1–7. Mar. 1987.
47. BOTSWANA, MINISTRY OF FINANCE AND DEVELOPMENT PLANNING (MFDP), CENTRAL STATISTICS OFFICE, and MINISTRY OF HEALTH (MOH). FAMILY HEALTH DIVISION, and DEMOGRAPHIC AND HEALTH SURVEYS (DHS). INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE. Botswana Family Health Survey 2: 1988: preliminary report. [Gaborone], Botswana and Columbia, Maryland, MFDP and MOH and DHS, Jan. 1989. 17 p.
* 48. BOUNDS, W., VESSEY, M., and WIGGINS, P. A randomized double-blind trial of two low dose combined oral contraceptives. British Journal of Obstetrics and Gynaecology 86(4): 325–329. Apr. 1979.
49. BRADLEY, D.D., WINGERD, J., PETITTI, D.B., KRAUSS, R.M., and RAMCHARAN, S. Serum high-density-lipoprotein cholesterol in women using oral contraceptives, estrogens and progestins. New England Journal of Medicine 299(1): 17–20. Jul. 6, 1978.
50. BRAMLEY, M. and KINGHORN, G. Do oral contraceptives inhibit Trichomonas vaginalis? Sexually Transmitted Diseases 6(4): 261–263. Oct.-Dec. 1979.
51. BRAT, T. Clinical trial with a new low o...trogen combined oral contraceptive. Current Medical Research and Opinion 2(8): 465–470. 1974.
52. BREAST CANCER TRIALS COMMITTEE. Adjuvant tamoxifen in the management of operable breast cancer: the Scottish trial. Lancet 2(8552): 171–175. Jul. 25, 1987.
53. BRINTON, L.A., HUGGINS, G.R., LEHMAN, H.F., MALLIN, K., SAVITZ, D.A., TRAPIDO, E., ROSENTHAL, J., and HOOVER, R. Long-term use of oral contraceptives and risk of invasive cervical cancer. International Journal of Cancer 38(3): 339–344. Sep. 15, 1986.
54. BRINTON, L.A., TASHIMA, K.T., LEHMAN, H.F., LEVINE, R.S., MALLIN, K., SAVITZ, D.A., STOLLEY, P.D., and FRAUMENI, J.F., Jr. Epidemiology of cervical cancer by cell type. Cancer Research 47(6): 1706–1711. Mar. 15, 1987.
55. BRINTON, L.A., VESSEY, M.P., FLAVEL, R., and YEATES, D. Risk factors for benign breast disease. American Journal of Epidemiology 113(3): 203–214. Mar. 1981.
56. BROOKS, P.G. Pill formulations and their effect on lipid and carbohydrate metabolism. Journal of Reproductive Medicine 29(7, Suppl.): 539–546. Jul. 1984.
57. BROOKS, P.G. The relationship of estrogen and progesterone to breast disease. Journal of Reproductive Medicine 29(7, Suppl.): 530–538. Jul. 1984.
58. BURKMAN, R.T., ROBINSON, J.C., KRUSZON-MORAN, D., KIMBALL, A.W., KWITEROVICH, P., and BURFORD, R.G. Lipid and lipoprotein changes associated with oral contraceptive use: a randomized clinical trial. Obstetrics and Gynecology 71(1): 33–38. Jan. 1988.
59. BURNAKIS, T.G. and HILDEBRANDT, N.B. Pelvic inflammatory

disease: a review with emphasis on antimicrobial therapy. Reviews of Infectious Diseases 8(1): 86–116. Jan.-Feb. 1986.
60. BYE, P.G.T. and ELSTEIN, M. Clinical assessment of a low-oestrogen combined oral contraceptive. British Medical Journal 2(5863): 389–392. May 19, 1973.
61. BYERS, T., GRAHAM, S., RZEPKA, T., and MARSHALL, J. Lactation and breast cancer. American Journal of Epidemiology 121(5): 664–674. May 1985.
62. CAILLOUETTE, J.C. Ovarian cysts and oral contraceptives. [Letter] American Journal of Obstetrics and Gynecology 160(2): 523–524. Feb. 1989.
63. CAILLOUETTE, J.C. and KOEHLER, A.L. Phasic contraceptive pills and functional ovarian cysts. American Journal of Obstetrics and Gynecology 156(6): 1538–1542. Jun. 1987.
64. CAIRNS, V., REIL, U., DOERING, A., KOENIG, W., STIEBER, J., and KLEINBAUM, D.G. Oral contraceptive use and blood pressure in a German metropolitan population. International Journal of Epidemiology 14(3): 389–395. Sep. 1985.
65. CAMERON, D.W., PLUMMER, F., NDINYA-ACHOLA, J.O., NGUGI, and RONALD, A.R. The use of condoms by the clients of prostitutes reduce the prevalence of genital ulcer disease (GUD). [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Sweden, Jun. 12–16, 1988.
66. CAMPODONICO G., I., GUERRERO, B., and LANDA I., L. Effect of a low-dose oral contraceptive (150 µg levonorgestrel and 30 µg ethinylestradiol) on lactation. Clinical Therapeutics 1(6): 454–459. 1978.
67. CANCER AND STEROID HORMONE STUDY GROUP. Oral-contraceptive use and the risk of breast cancer. New England Journal of Medicine 315(7): 405–411. Aug. 14, 1986.
* 68. CANCER AND STEROID HORMONE STUDY OF THE CENTERS FOR DISEASE CONTROL AND THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT. The reduction in risk of ovarian cancer associated with oral-contraceptive use. New England Journal of Medicine 316(11): 650–655. Mar. 12, 1987.
* 69. CANCER AND STEROID HORMONE STUDY. Combination oral contraceptive use and the risk of endometrial cancer. Journal of the American Medical Association 257(6): 796–800. Feb. 13, 1987.
70. CARAEL, M., VAN DE PERRE, P.H., LEPAGE, P.H., ALLEN, S., NSENGUMUREMYI, F., VAN GOETHEM, C., NTAHORUTABA, M., NZARAMBA, D., and CLUMECK, N. Human immunodeficiency virus transmission among heterosexual couples in Central Africa. AIDS 2(3): 201–205. 1988.
71. CASAGRANDE, J.T., LOUIE, E.W., PIKE, M.C., ROY, S., ROSS, R.K., and HENDERSON, B.E. "Incessant ovulation" and ovarian cancer. Lancet 2(8135): 170–174. Jul. 28, 1979.
72. CELENTANO, D.D. Oral contraceptives and cervical cancer. Journal of the American Medical Association 259(16): 2696. May 13, 1988.
73. CELENTANO, D.D., KLASSEN, A.C., WEISMAN, C.S., and ROSENSHEIN, N.B. The role of contraceptive use in cervical cancer: the Maryland cervical cancer case-control study. American Journal of Epidemiology 126(4): 592–604. Oct. 1987.
74. CHAMRATRITHIRONG, A., KAMNUANSILPA, P., and KNODEL, J. Contraceptive practice and fertility in Thailand: results of the third Contraceptive Prevalence Survey. Studies in Family Planning 17(6, Pt. 1): 278–287. Nov.-Dec. 1986.
75. CHAN, W.Y. Prostaglandins and nonsteroidal antiinflammatory drugs in dysmenorrhea. Annual Review of Pharmacology and Toxicology 23: 131–149. 1983.
76. CHANG, M.C. Reminiscences on early pill development. Network 7(4): 6. Summer 1986.
77. CHAO, S. The effect of lactation on ovulation and fertility. Clinics in Perinatology 14(1): 39–50. Mar. 1987.
78. CHATWAL, T. (United Nations Population Fund) [UNFPA OC supplies, 1985–1987] Personal communication, Oct. 10, 1988.
79. CHAIYOVAN, N., KAMNUANSILPA, P., and KNODEL, J. Thailand Demographic and Health Survey 1987. Bangkok and Columbia, Maryland, Institute of Population Studies, Chulalongkorn University, and Institute for Resource Development/ Westinghouse, May 1988. 217 p.
80. CHIEH-JOHNSON, D., CROSS, A.R., WAY, A.A., and SULLIVAN, J.M. Liberia demographic and health survey 1986. Monrovia, Liberia, and Columbia, Maryland, Republic of Liberia, Bureau of Statistics and Institute for Resource Development/Westinghouse, Feb. 1988. 117 p.
81. CHILVERS, C., MANT, D., and PIKE, M.C. Cervical adenocarcinoma and oral contraceptives. British Medical Journal 295(6611): 1446–1447. Dec. 5, 1987.
82. CHILVERS, C., MCPHERSON, K., PETO, J., PIKE, M.C., and VESSEY, M.P. Oral contraceptive use and breast cancer risk in young women. Lancet 1(8645): 973–982. May 6, 1989.
83. CHINA POPULATION INFORMATION CENTRE (CPIC). Analysis on China's National One-per-thousand-population Fertility Sampling Survey. Beijing, China, CPIC, 1984. 182 p.
84. CHINA, GENERAL OFFICE OF THE STATE FAMILY PLANNING COMMISSION. Statistics on population and family planning of China: 1986. 1987. 8 p. (Unpublished)
85. CHOUDHURY, A.Y., LAING, J.E., KHAN, A.R., and CLARK, S. Use-effectiveness of oral pills and condoms. Dhaka, Bangladesh, Program for the Introduction and Adaptation of Contraceptive Technology, Nov. 1986. 158 p.
86. CHOWDHURY, V., JOSHI, U.M., GOPALKRISHNA, K., BETRABET, S., MEHTA, S., and SAXENA, B.N. Escape ovulation in women due to the missing of low dose combination oral contraceptive pills. Contraception 22(3): 241–247. Sep. 1980.
87. CLARKE, E.A., HATCHER, J., MCKEOWN-EYSSEN, G.E., and KICKBUSH, G.M. Cervical dysplasia: association with sexual behavior, smoking, and oral contraceptive use? American Journal of Obstetrics and Gynecology 151(5): 612–616. Mar. 1, 1985.
88. CLELAND J.G. and SATHAR, Z.A. The effect of birth spacing on childhood mortality in Pakistan. Population Studies 38(3): 401–418. Nov. 1984.
89. CLIQUET, R. and LODEWIJCKX, E. The contraceptive transition in Flanders. European Journal of Population 2(1): 71–84. May 1986.
90. COHEN, J. Clinical use of biphasic and triphasic pills. IPPF Medical Bulletin 19(4): 1–2. Aug. 1985.
91. COLLABORATIVE GROUP FOR THE STUDY OF STROKE IN YOUNG WOMEN. Oral contraceptives and stroke in young women: associated risk factors. Journal of the American Medical Association 231(7): 718–722. Feb. 17, 1975.
92. COLOMBIA, CENTRAL REGION CORPORATION OF POPULATION (CCRP), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (DHS/IRD). Colombia Encuesta de Demografía y salud 1986: informe preliminar. [Colombia Demographic Health Survey 1986: preliminary report.][SPA] Bogotá, Colombia, and Columbia, Maryland, CCRP and DHS/IRD, Mar. 1987. 34 p.
93. COPPEN, A. and KESSEL, N. Menstruation and personality. British Journal of Psychiatry 109: 711–721. November 1963.
94. COSTA RICA DEMOGRAPHIC ASSOCIATION (CRDA), and UNITED STATES. CENTERS FOR DISEASE CONTROL (CDC). The Costa Rica Fertility and Health Survey, 1986. [San Jose,] Costa Rica and Atlanta, Georgia, CRDA and CDC, Sep. 1987. 100 p.
95. COY, J.F., MAIR, C.H., and RATKOWSKY, D.A. Breastfeeding and oral contraceptives: Tasmanian survey. Australian Paediatric Journal 19(3): 168–171. Sep. 1983.
96. CRAMER, D.W., GOLDMAN, M.B., SCHIFF, I., et al. The relationship of tubal infertility to barrier method and oral contraceptive use. Journal of the American Medical Association 257(18): 2446–2450. May 8, 1987.
97. CRAMER, D.W., HUTCHISON, G.B., WELCH, W.R., SCULLY, R.E., and KNAPP, R.C. Factors affecting the association of oral contraceptives and ovarian cancer. New England Journal of Medicine 307(17): 1047–1051. Oct. 21, 1982.
98. CROFT, P. and HANNAFORD, P.C. Risk factors for acute myocardial infarction in women: evidence from the Royal College of General Practitioners' Oral Contraception Study. British Medical Journal 298: 165–168. Jan. 21, 1989.
99. CROOK, D., GODSLAND, I.F., and WYNN, V. Oral contraceptives and coronary heart disease: modulation of glucose tolerance and plasma lipid risk factors by progestins. American Journal of Obstetrics and Gynecology 158(6, Pt.2): 1612–1620. Jun. 1988.
100. CROXATTO, H.B., DAZ, S., PERALTA, O., JUEZ, G., HERREROS, C., CASADO, M.E., SALVATIERRA, A.M., MIRANDA, P., and DURN, E. Fertility regulation in nursing women: 4. Long-term influence of a low-dose combined oral contraceptive initiated at day 30 postpartum upon lactation and infant growth. Contraception 27(1): 13–25. Jan. 1983.
101. CULLBERG, G., SAMSIOE, G., ANDERSEN, R.F., et al. Two oral contraceptives, efficacy, serum proteins, and lipid metabolism: a comparative multicentre study on a triphasic and a fixed dose combination. Contraception 26(3): 229–243. Sep. 1982.
102. CULLBERG, J. Mental effects of hormone preparations with varied gestagen doses and constant oestrogen dose as compared to placebo. In: Psychosomatic medicine in obstetrics and gynaecology. Basel, Switzerland, Karger, 1972. p. 503–506.
103. CUZICK, J. Age dependence in cancers of the breast, ovary and endometrium. In: Likhachev, A., Anisimov, V., and Montesano, R., eds. Age-related factors in carcinogenesis. Lyon, France, World Health Organization, International Agency for Research on Cancer (IARC), 1985. (IARC Scientific Pub. No. 58) p. 97–104.
104. DARROW, W.W., BIGLER, W., DEPPE, D., FRENCH, J., GILL, P., POTTERAT, J., RAVENHOLT, O., SCHABLE, C., SIKES, R.K., and WOFSY, C. HIV antibody in 640 U.S. prostitutes with no evidence of intravenous (IV)-drug abuse. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Sweden, Jun. 12–16, 1988.
105. DARROW, W.W., COHEN, J.B., FRENCH, J., GILL, P., SIKES, R.K., WITTE, J., et al. Multicenter study of HIV antibody in U.S. prostitutes. [Abstract] Presented at the 3rd International Conference on AIDS, Washington, D.C., Jun. 1–5, 1987.
106. DEL JUNCO, D.J. and ANNEGERS, J.F. Do oral contraceptives prevent rheumatoid arthritis? In reply. [Letter] Journal of the American Medical Association 256(2): 215–216. Jul. 11, 1986.
107. DERMAN, R. Oral contraceptives: assessment of benefits. Journal of Reproductive Medicine 31(9, Suppl.): 879–886. Sep. 1986.
108. DÍAZ, S., PERALTA, O., JUEZ, G., HERREROS, C., CASADO, M.E., SALVATIERRA, A.M., MIRANDA, P., DURN, E., and CROXATTO, H.B. Fertility regulation in nursing women: 3. Short-term influence of a low-dose combined oral contraceptive upon lactation and infant growth. Contraception 27(1): 1–11. Jan. 1983.
109. DICKEY, R. (Fertility Institute of New Orleans) [Multiphasic vs. monophasic OCs] Personal communication, Dec. 12, 1988.
110. DICKEY, R.P. Managing contraceptive pill patients. Durant, Oklahoma, Creative Informatics, 1987. 259 p.
111. DICKEY, R.P. Oral contraceptive user guide. Durant, Oklahoma, Infomatic Guides, 1987. 145 p.
* 112. DIONNE, P. and VICKERSON, F. A double-blind comparison of two oral contraceptives containing 50 micrograms and 30 micrograms ethinyl estradiol. Current Therapeutic Research, Clinical and Experimental 16(4): 281–288. Apr. 1974.
113. DJERASSI, C. The politics of contraception. New York, W.W. Norton, 1979. 274 p.
114. DOMINICAN REPUBLIC. CONSEJO NACIONAL DE POBLACION Y FAMILIA (CONAPOFA), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Demografica y de Salud: DHS-86. [Dominican Republic Demographic and Health Survey: DHS-86.][SPA] Santo Domingo, Dominican Republic and Columbia, Maryland, CONAPOFA and IRD, Dec. 1987. 139 p.
115. DORING, G., BAUR, S., FRANK, P., FREUNDL, G., and SOTTONG, U. Ergebnisse einer repräsentativen Umfrage zum Familie iplanungverhalten in der Bundesrepublick Deutschland 1985. [Results of a representative survey of family planning behavior in the Federal Republic of Germany 1985.][GER] Geburtshilfe and Frauenheilkunde 12(46): 857–920. Dec. 1986.
116. DRIFE, J. and GUILLEBAUD, J. Hormonal contraception and cancer. British Journal of Hospital Medicine 35(1): 25–29. Jan. 1986.
117. EARLY BREAST CANCER TRIALISTS' COLLABORATIVE GROUP. Effects of adjuvant tamoxifen and of cytotoxic therapy on mortality in early breast cancer: an overview of 61 randomized trials among 28,896 women. New England Journal of Medicine 319(26): 1681–1692. Dec. 29, 1988.
118. EBELING, K., NISCHAN, P., and SCHINDLER, C. Use of oral contraceptives and risk of invasive cervical cancer in previously screened women. International Journal of Cancer 39(4): 427–430. 1987.
119. ECUADOR. CENTRO DE ESTUDIOS DE POBLACION Y PATERNIDAD RESPONSABLE (CEPAR), and INSTITUTO NACIONAL DE INVESTIGACIONES NUTRICIONALES Y MEDICO SOCIALES (ININMS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Ecuador Encuesta Nacional de Demografía y Salud Familiar 1987: informe preliminar. [Ecuador Demographic and Health Survey 1987: preliminary report.][SPA] [Quito], Ecuador and Columbia, Maryland, CEPAR, ININMS, and IRD, Jul. 1987. 25 p.
* 120. EDELMAN, D.A., KOTHENBEUTEL, R., LEVINSKI, M.J., and KELLY, S.E. Comparative trials of low-dose combined oral contraceptives. Journal of Reproductive Medicine 28(3): 195–200. Mar. 1983.
121. EDGREN, R.A. (Syntex Laboratories) [The comparative effects of currently and previously available oral contraceptive formulations] Personal communication, Feb. 21, 1989.
122. EGYPT, NATIONAL POPULATION COUNCIL (ENPC), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD/W). Egypt Demographic and Health Survey 1988: preliminary report. [Cairo], Egypt and [Columbia, Maryland], ENCP and IRD/W, Apr. 1989. 39 p.
123. EL SALVADOR. ASOCIACION DEMOGRAFICA SALVADORENA (ADS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Nacional de Salud Familiar FESAL—85. [El Salvador National Survey of Family Health 1985.][SPA] San Salvador, El Salvador and Columbia, Maryland, ADS and IRD, Sep. 1987. 179 p.
124. ELLERY, C., MACLENNAN, R., BERRY, G., and SHEARMAN, R.P. A case-control study of breast cancer in relation to the use of steroid contraceptive agents. Medical Journal of Australia 144(4): 173–176. Feb. 17, 1986.
125. ELLIS, V. (US Agency for International Development) [USAID OC supplies, 1984–1987] Personal communication, May 10, 1989.
126. ELLSWORTH, H. Focus on Triphasil. Journal of Reproductive Medicine 31(Suppl. 6): 559–564. Jun. 1986.
127. EMMANUEL, S.C., LI, S.B., NG, T.P., and CHEN, A.J. Third National Family Planning and Population Survey. Singapore, Singapore Family Planning and Population Board, 1984. 83 p.
128. ESCHENBACH, D.A., HARNISCH, J.P., and HOLMES, K.K. Pathogenesis of acute pelvic inflammatory disease: role of contraception and other risk factors. American Journal of Obstetrics and Gynecology 128(8): 838–850. Aug. 15, 1977.
129. ESCOBEDO, L. and LEE, N.C. Beyond contraception: the health benefits and risks of the pill. IPPF Medical Bulletin 22(2): 1–2. Apr. 1988.
130. ESDAILE, J.M. and HORWITZ, R.I. Observational studies of cause-effect relationships: an analysis of methodologic problems as illustrated by the conflicting data for the role of oral contraceptives in the etiology of rheumatoid arthritis. Journal of Chronic Diseases 39(10): 841–852. 1986.
131. FASAL, E. and PAFFENBARGER, R.S., Jr. Oral contraceptives as related to cancer and benign lesions of the breast. Journal of the National Cancer Institute 55(4): 767–773. Oct. 1975.
132. FAULKNER, W.L. and ORY, H.W. Intrauterine devices and acute pelvic inflammatory disease. Journal of the American Medical Association 235(17): 1851–1853. Apr. 26, 1976.
133. FAY, R.A. Failure with the new triphasic oral contraceptive Logynon. British Medical Journal 284(6308): 17–18. Jan. 2, 1982.
134. FEDERMAN, D.D. General principles of endocrinology. In: Williams, R.H., ed. Textbook of endocrinology. 6th ed. Philadelphia, W.B. Saunders, 1981. p. 1–14.
135. FEINSTEIN, A.R. Scientific standards in epidemiologic studies of the menace of daily life. Science 242(4883): 1257–1263. Dec. 2, 1988.
136. FELDBLUM, P.J., BURTON, N., and ROSENBERG, M.J. Pelvic inflammatory disease and oral contraceptive use. African Journal of Sexually Transmitted Diseases 2(2): 36–38. Oct. 1986.
137. FISCH, I.R. and FRANK, J. Oral contraceptives and blood pressure. Journal of the American Medical Association 237(23): 2499–2503. Jun. 6, 1977.
138. FISCH, I.R., FREEDMAN, S.H., and MYATT, A.V. Oral contraceptives, pregnancy, and blood pressure. Journal of the American Medical Association 222(12): 1507–1510. Dec. 18, 1972.
139. FISCHL, M., FAYNE, T., FLANAGAN, S., STEVENS, R., FLETCHER, M., LAVOIE, L., and TRAPIDO, E. Seroprevalence and risks of HIV infections in spouses of persons infected with HIV. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Sweden, Jun. 12–16, 1988.
140. FISCHL, M.A., DICKINSON, G.M., FLANAGAN, S., and FLETCHER, M.A. Human immunodeficiency virus (HIV) among female prostitutes in south Florida. [Abstract] Presented at the 3rd International Conference on AIDS, Washington, D.C., Jun. 1–5, 1987.
141. FORMAN, D., VINCENT, T.J., and DOLL, R. Cancer of the liver and the use of oral contraceptives. British Medical Journal 292(6532): 1359–1361. May 24, 1986.
142. FORNARY, J. (International Planned Parenthood Federation) [IPPF OC supplies, 1982–1987] Personal communication, Jun. 9, 1989.
143. FORREST, J.D. Unintended pregnancy among American women. Family Planning Perspectives 19(2): 76–77. Mar.-Apr. 1987.
* 144. FORREST, J.D. and FORDYCE, R.R. U.S. women's contraceptive attitudes and practice: how have they changed in the 1980s? Family Planning Perspectives 20(3): 112–118. May-Jun. 1988.
145. FORTNEY, J.A. Contraception for women forty and over. Presented at the Annual Meeting of the Society for the Advancement of Contraception, Chicago, Sep. 23–26, 1986. 28 p.
146. FOSS, G.L. and FOTHERBY, K. Clinical trial of a low dose combined oral contraceptive ("Ovranette"). Current Medical Research and Opinion 3(2): 72–76. 1975.
147. FOSS, G.L. and FOTHERBY, K. Low-oestrogen combined oral contraceptive. Acta Europaea Fertilitatis 4: 57–58. Jun. 1973.
148. FOTHERBY, K. Effect of oral contraceptives on serum lipids and cardiovascular disease. British Journal of Family Planning 11(3): 86–91. Oct. 1985.
149. FOTHERBY, K. Metabolic effects of low dose combined oral contraceptives. British Journal of Family Planning 10(1): 15–19. Apr. 1984.
150. FOTHERBY, K. Oral contraceptives, lipids and cardiovascular disease. Contraception 31(4): 367–394. Apr. 1985.
151. FRANCESCHI, S., LA VECCHIA, C., and TALAMINI, R. Oral contraceptives and cervical neoplasia: pooled information from retrospective and prospective epidemiologic studies. Tumori 72(1): 21–30. Feb. 28, 1986.
152. FRANK, P. Oral contraceptives and arterial disease—recent evidence from the Royal College of General Practitioners Oral Contraception Study. Singapore Journal of Obstetrics and Gynaecology 15(1, Suppl.): 14–21. Mar. 1984.
* 153. FRASER, I.S. and JANSEN, R.P.S. Why do inadvertent pregnancies occur in oral contraceptive users? Effectiveness of oral contraceptive regimens and interfering factors. Contraception 27(6): 531–551. Jun. 1983.
* 154. FRASSINELLI-GUNDERSON, E.P., MARGEN, S., and BROWN, J.R. Iron stores in users of oral contraceptive agents. American Journal of Clinical Nutrition 41(4): 703–712. Apr. 1985.
155. GALFETTI, K.M. (The Pathfinder Fund) [Pathfinder OC supplies, 1982–1987] Personal communication, Jun. 9, 1989.
156. GASPARD, U.J., DEVILLE, J.L., and DUBOIS, M. Clinical experience with a triphasic oral contraceptive ("Trinordiol") in young women. Current Medical Research and Opinion 8(6): 395–404. 1983.
157. GASPARD, U.J., DUBOIS, M., GILLAIN, D., FRANCHIMONT, P., and DUVIVIER, J. Ovarian function is effectively inhibited by a low-dose triphasic oral contraceptive containing ethinylestradiol and levonorgestrel. Contraception 29(4): 305–318. Apr. 1984.
158. GERAIS, A.S., ALWAHAB, S., OMRAN, K.F., and LIAO, W.C. A comparative study of two estrogen dosages in combined oral contraceptives among Sudanese women. International Journal of Gynecology and Obstetrics 21(6): 459–468. Dec. 1983.
159. GERAIS, A.S. and RUSHWAN, H. A crossover pill study among Sudanese women. International Journal of Gynecology and Obstetrics 23: 229–233. 1985.
160. GIROLAMI, A., PROCIDANO, M., VICARIOTTO, M., CAPPELLATO, G., and VICARI, T. The effect of low-dose estroprogestinic preparations on prothrombin complex factors: no significant increase after an 8-month trial. Biut 50(3): 141–148. Mar. 1985.
161. GOEDERT, J.J., EYSTER, M.E., RAGNI, M.V., BIGGAR, R.J., and GAIL, M.H. Rate of heterosexual HIV transmission and associated risk with HIV-antigen. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Sweden, Jun. 12–16, 1988.

* 162. GOLDBAUM, G.M., KENDRICK, J.S., HOGELIN, G.C., GENTRY, E.M., and BEHAVIORAL RISK FACTOR SURVEYS GROUP. The relative impact of smoking and oral contraceptive use on women in the United States. Journal of the American Medical Association 258(10): 1339–1342. Sep. 11, 1987.
163. GOLDBERG, H.I., FRIEDMAN, J.S., WONG, R., and RAJ-COOMAR, V. Fertility and family planning in Mauritius. Presented at the Annual Meeting of the Population Association of America, San Francisco, Apr. 3–5, 1986. 23 p.
164. GOLDMAN, N., PEBLEY, A.R., WESTOFF, C.F., and PAUL, L.E. Contraceptive failure rates in Latin America. International Family Planning Perspectives 9(2): 50–57. Jun. 1983.
165. GOLDMAN, N. and WESTOFF, C.F. Probabilities of conception in Latin America. 1982. 30 p. (Unpublished)
166. GONZALEZ, F. and MARKS, C. Hepatic tumors and oral contraceptives: surgical management. Journal of Surgical Oncology 29(3): 193–197. Jul. 1985.
167. GORDON, T., CASTELLI, W.P., HJORTLAND, M.C., KANNEL, W.B., and DAWBER, T.R. High density lipoprotein as a protective factor against coronary heart disease: the Framingham Study. American Journal of Medicine 62(5): 707–714. May 1977.
168. GORRILL, M.J. and MARSHALL, J.R. Pharmacology of estrogens and estrogen-induced effects on non-reproductive organs and systems. Journal of Reproductive Medicine 31(9, Suppl.): 847–847. Sep. 1986.
169. GRADY, W.R., HAYWARD, M.D., and FLORLY, F.A. Contraceptive discontinuation among married women in the United States. Studies in Family Planning 19(4): 227–235. Jul.-Aug. 1988.
170. GRADY, W.R., HAYWARD, M.D., and YAGI, J. Contraceptive failure in the United States: estimates from the 1982 National Survey of Family Growth. Family Planning Perspectives 18(5): 200–209. Sep.-Oct. 1986.
171. GRADY, W.R., HIRSCH, M.B., KEEN, N., and VAUGHAN, B. Contraceptive failure and continuation among married women in the United States, 1970–75. Studies in Family Planning 14(1): 9–19. Jan. 1983.
172. GRAEFF, H., BATTIS, P., HAFTER, R., and ZANDER, J. Evaluation of hypercoagulability in users of oral contraceptives. Klinische Wochenschrift 55(4): 175–179. Feb. 15, 1977.
173. GRAHAM, H. Failure with the new triphasic oral contraceptive Logynon. [Letter] British Medical Journal 284(6313): 422. Feb. 6, 1982.
174. GRANT, J.P. The state of the world's children 1988. Oxford, Oxford University Press, 1988. 86 p.
175. GREENBLATT, R.M., LUKEHART, S.L., PLUMMER, F.A., QUINN, T.C., CRITCHLOW, C.W., D'COSTA, L.J., et al. Genital ulceration as a risk factor for human immunodeficiency virus infection in Kenya. [Abstract] Presented at the 3rd International Conference on AIDS, Washington, D.C., Jun. 1–5, 1987.
176. GREEP, R.O. The biological history of the pill. In: Parnham, M.J. and Bruinvels, J., eds. Discoveries in pharmacology. Vol. 2. Amsterdam, Elsevier Science Publishers, 1984. p. 321–337.
177. GRIMES, D.A. and HUGHES, J.M. Use of multiphasic oral contraceptives and hospitalizations of women with functional ovarian cysts in the United States. (To be published by Obstetrics and Gynecology)
178. GROOT, H. (Family Planning International Assistance) [FPIA OC supplies, 1982–1987] Personal communication, Feb. 24, 1988.
179. GRUNENTHAL-SERVICE, THE. Internationaler Warenzeichen-Wegweiser für hormonale Kontrazeptiva. [International directory for hormonal contraceptives.] [G&R] [Tables] Stolberg, Federal Republic of Germany, Burg Verlag & Druck, Nov. 1987. 125 p.
180. GUATEMALA. MINISTERIO DE SALUD PUBLICA Y ASISTENCIA SOCIAL (MSPAS). and INSTITUTO DE NUTRICION DE CENTRO AMERICA Y PANAMA (INCAP). and DEMOGRAPHIC AND HEALTH SURVEYS (DHS). INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE. Guatemala encuesta nacional de salud materno infantil; 1987: informe preliminar. [Guatemala: 1987 National Maternal and Child Health Survey: preliminary report.] [SPA] Guatemala City, Guatemala and Columbia, Maryland, MSPAS and INCAP and DHS, Mar. 1988. 26 p.
181. GUERRA, F., WARREN, C.W., OBERLE, M.W., and MORRIS, L. Maternal-child health/family planning survey: Panama 1984. Atlanta, Georgia, Centers for Disease Control, Mar. 1986. 140 p.
182. GUILLEBAUD, J. The 150/30 formulation: experience in the United Kingdom. Journal of Reproductive Medicine 28(Suppl. 1): 66–70. Jan. 1983.
183. GUILLEBAUD, J. The forgotten pill—and the paramount importance of the pill-free week. British Journal of Family Planning 12(4): 35–43. Jan. 1987.
184. GUILLEBAUD, J. The pill. 2nd ed. Oxford, Oxford University Press, 1983. 278 p.
* 185. GUILLEBAUD, J. Practical prescribing of the combined oral contraceptive pill. In: Filshie, M. and Guillebaud, J., eds. Science and practice. Guildford, Surrey, UK, Butterworths, 1989. (In press)
186. HACETTEPE UNIVERSITY. INSTITUTE OF POPULATION STUDIES (IPS). 1983 Turkish population and health survey. Ankara, Turkey, IPS, 1987. 130 p.
187. HANSON, F.W. and NISWANDER, K.R. A new low dose norethindrone acetate (0.6 mg) ethinyl estradiol (30 mcg) combination oral contraceptive. Journal of Reproductive Medicine 12(3): 109–111. Mar. 1974.
188. HARFOUCHE, J.K. Appearance of contraceptive steroids in human milk: effects on the child. Journal of Biosocial Science (Suppl. 4): 165–179. 1977.
189. HARLAP, S. HIV and fertility regulation. 1987. 26 p. (Unpublished)
190. HARRIS, R.W., BRINTON, L.A., COWDELL, R.H., SKEGG, D.C., SMITH, P.G., VESSEY, M.P., and DOLL, R. Characteristics of women with dysplasia or carcinoma in situ of the cervix uteri. British Journal of Cancer 42: 359–369. 1980.
191. HARRISON, H.E., COSTIN, M., MEDER, J.B., BOWNDS, L.M., SIM, D.A., LEWIS, M., and ALEXANDER, E.R. Cervical Chlamydia trachomatis infection in university women: relationship to history, contraception, ectopy, and cervicitis. American Journal of Obstetrics and Gynecology 153(3): 244–251. Oct. 1, 1985.
192. HARVENGT, C., DESAGER, J.P., GASPARD, U., and LEPOT, M. Changes in lipoprotein composition in women receiving two low-dose oral contraceptives containing ethinylestradiol and gonane progestins. Contraception 37(6): 565–575. Jun. 1988.
193. HASPELS, A.A. Clinical experience with a low-dose contraceptive agent: European studies. Journal of Reproductive Medicine 28(Suppl. 1): 71–76. Jan. 1983.
194. HATCHER, R.A., GUEST, F., STEWART, F., STEWART, G.K., TRUSSELL, J., CEREL, S., and CATES, W. Contraceptive technology 1986–1987. 13th rev. ed. New York, Irvington Publishers, 1986. 310 p.
195. HATCHER, R.A., GUEST, F., STEWART, F., STEWART, G.K., TRUSSELL, J., BOWEN, S.C., and CATES, W. Contraceptive technology 1988–1989. 14th rev. ed. Atlanta, Georgia, Printed Matter, 1988. 437 p.
196. HAZES, J.M. and DIJKMANS, B.A. Do oral contraceptives prevent rheumatoid arthritis? [Letter] Journal of the American Medical Association 256(2): 215. Jul. 11, 1986.
197. HEATH, K., DA COSTA-MARTINEZ, D., and SHEON, A.R. Trinidad and Tobago: demographic and health survey 1987. Port-of-Spain, Trinidad and Columbia, Maryland, Family Planning Association of Trinidad and Tobago and Institute for Resource Development/Westinghouse, Nov. 1988. 134 p.
198. HELLBERG, D., VALENTIN, J., and NILSSON, S. Long-term use of oral contraceptives and cervical neoplasia: an association confounded by other risk factors? Contraception 32(4): 337–346. Oct. 1985.
199. HELMRICH, S.P., ROSENBERG, L., KAUFMAN, D.W., STROM, B., and SHAPIRO, S. Venous thromboembolism in relation to oral contraceptive use. Obstetrics and Gynecology 69(1): 91–95. Jan. 1987.
200. HELMRICH, S.P., ROSENBERG, L., KAUFMAN, D.W., MILLER, D.R., SCHOTTENFELD, D., STOLLEY, P.D., and SHAPIRO, S. Lack of an elevated risk of malignant melanoma in relation to oral contraceptive use. Journal of the National Cancer Institute 72(3): 617–620. Mar. 1984.
201. HENDERSON, B.E., CASAGRANDE, J.T., PIKE, M.C., MACK, T., ROSARIO, I., and DUKE, A. The epidemiology of endometrial cancer in young women. British Journal of Cancer 47(6): 749–756. Jun. 1983.
202. HENDERSON, B.E., PRESTON-MARTIN, S., EDMONDSON, H.A., PETERS, R.L., and PIKE, M.C. Hepatocellular carcinoma and oral contraceptives. British Journal of Cancer 48(3): 437–440. Sep. 1983.
203. HENNEKENS, C.H., SPEIZER, F.E., LIPNICK, R.J., ROSNER, B., BAIN, C., BELANGER, C., STAMPFER, M.J., WILLETT, W., and PETO, R. A case-control study of oral contraceptive use and breast cancer. Journal of the National Cancer Institute 72(1): 39–42. Jan. 1984.
204. HENNEY, J.E. and DEVITA, V.T., Jr. Breast cancer. In: Petersdorf, R.G., Adams, R.D., Braunwald, E., Isselbacher, K.J., Martin, J.B., and Wilson, J.D., eds. Harrison's principles of internal medicine. 10th ed. New York, McGraw-Hill, 1983. p. 788–795.
205. HENSHAW, S.K. and MARTIRE, G. Abortion and the public opinion polls. Family Planning Perspectives 14(2): 53–55, 59–62. Mar.-Apr. 1982.
206. HILDRETH, N.G., KELSEY, J.L., LIVOLSI, V.A., FISCHER, D.B., HOLFORD, T.R., MOSTOW, E.D., SCHWARTZ, P.E., and WHITE, C. An epidemiologic study of epithelial carcinoma of the ovary. American Journal of Epidemiology 114(3): 398–405. Sep. 1981.
207. HILL, A.B. Statistical evidence and inference. In: Principles of medical statistics. 9th ed. New York, Oxford University Press, 1971. p. 309–323.
208. HIRA, S.K., KAMANGA, J., MACUACUA, R., and PERINE, P. Oral contraceptive use and HIV infection. [1988]. 2 p. (Unpublished)
209. HOBCRAFT, J., MCDONALD, J., and RUTSTEIN, S. Childspacing effects on infant and early child mortality. Population Index 49(4): 585–618. Winter 1983.
210. HOLCK, S. Cancer and the pill. World Health, Nov. 1987. p. 18–19.
* 211. HOLCK, S. Hormonal contraceptives and the risk of cancer. World Health Statistics Quarterly 40(3): 225–232. 1987.
212. HOLLY, E.A., WEISS, N.S., and LIFF, J.M. Cutaneous melanoma in relation to exogenous hormones and reproductive factors. Journal of the National Cancer Institute 70(5): 827–831. May 1983.
213. HOLMES, K.K. Pelvic inflammatory disease. In: Petersdorf, R.G., Adams, R.D., Braunwald, E., Isselbacher, K.J., Martin, J.B., and Wilson, J.D., eds. Harrison's principles of internal medicine. 10th ed. New York, McGraw-Hill, 1983. p. 902–908.
214. HONDURAS. MINISTRY OF PUBLIC HEALTH (HMPH). and ASSOCIATION FOR FAMILY PLANNING IN HONDURAS (ASHONPLAFA). Maternal-child health and family planning survey: Honduras, 1984: Final report. [Tegucigalpa, Honduras], HMPH and ASHONPLAFA, Dec. 1986. 202 p.
215. HÖPFLINGER, F. and KÜHNE, F. Contraception: answers of wives and husbands compared in a survey of Swiss couples. Journal of Biosocial Science 16(2): 259–268. Apr. 1984.
* 216. HOWIE, P.W. The progestogen-only pill. British Journal of Obstetrics and Gynaecology 92(10): 1001–1002. Oct. 1985.
217. HUBER, D.H., KHAN, A.R., BROWN, K., MALAKAR, M., and WAIT, G. Oral and injectable contraceptives—the effects on breast-milk and child growth in Bangladesh. Feb. 1980. 22 p. (Unpublished)
218. HUGGINS, G.R. and ZUCKER, P.K. Oral contraceptives and neoplasia: 1987 update. Fertility and Sterility 47(5): 733–761. May 1987.
219. HUGHES, I. An open assessment of a new low dose oestrogen combined oral contraceptive. Journal of International Medical Research 6(1): 41–45. 1978.
220. HULKA, B.S., CHAMBLESS, L.E., KAUFMAN, D.G., FOWLER, W.C., Jr., and GREENBERG, B.G. Protection against endometrial carcinoma by combination-product oral contraceptives. Journal of the American Medical Association 247(4): 475–477. Jan. 22–29, 1982.
221. HULKA, B.S., KAUFMAN, D.G., FOWLER, W.C., Jr., GRIMSON, R.C., and GREENBERG, B.G. Predominance of early endometrial cancers after long-term estrogen use. Journal of the American Medical Association 244(21): 2419–2422. Nov. 28, 1980.
222. HULL, V.J. The effects of hormonal contraceptives on lactation: current findings, methodological considerations, and future priorities. Studies in Family Planning 12(4): 134–155. Apr. 1981.
223. HUNGARY. CENTRAL STATISTICAL OFFICE (CSO). Summary of the 1986 fertility surveys. Budapest, CSO, 1987. 21 p.
224. IMS LTD. Purchases of oral contraceptives. [Study prepared for the Population Information Program] May 1988. 116 p.
225. INDONESIA. CENTRAL BUREAU OF STATISTICS (CBS). and NATIONAL FAMILY PLANNING COORDINATING BOARD (NFPCB). and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). National Indonesia Contraceptive Prevalence Survey 1987. Jakarta and Columbia, Maryland, CBS, NFPCB, and IRD, Jan. 1989. 137 p.
226. INMAN, W.H.W. Oral contraceptives and fatal subarachnoid haemorrhage. British Medical Journal 2(6203): 1468–1470. Dec. 8, 1979.
227. INMAN, W.H.W., VESSEY, M.P., WESTERHOLM, B., and ENGELUND, A. Thromboembolic disease and the steroidal content of oral contraceptives: a report to the Committee on Safety of Drugs. British Medical Journal 2(5703): 203–209. Apr. 25, 1970.
228. INTERCONTINENTAL MEDICAL STATISTICS (IMS) AMERICA LTD. Purchases of oral contraceptives. [Study prepared for the Population Information Program] Oct. 1981. 3 p.
229. INTERCONTINENTAL MEDICAL STATISTICS (IMS) INTERNATIONAL LTD. Retail pharmacy purchases of oral contraceptives and components of oral contraceptives. [Study prepared for the Population Information Program] Nov. 1977 and Nov. 1978. 2 p.
230. INTERCONTINENTAL MEDICAL STATISTICS (IMS). Retail pharmacy purchases of oral contraceptives and components of oral contraceptives. [Study prepared for the Population Information Program] Oct. 1978. 1 p.
231. INTERNATIONAL PLANNED PARENTHOOD FEDERATION. IPPF statement on sexually transmitted diseases and reproductive health. IPPF Medical Bulletin 22(6): 3–4. Dec. 1988.
232. INTERNATIONAL PLANNED PARENTHOOD FEDERATION. Statement on breast feeding, fertility and contraception. IPPF Medical Bulletin 21(6): 5–6. Dec. 1987.
233. IRWIN, K.L., ROSERO-BIXBY, L., OBERLE, M.W., LEE, N.C., WHATLEY, A.S., FORTNEY, J.A., and BONHOMME, M.G. Oral contraceptives and cervical cancer risk in Costa Rica: detection bias or causal association? Journal of the American Medical Association 259(1): 59–64. Jan. 1, 1988.
234. ISHAK, R., HASSAN, K., and ARSHAT, H. Hemorrheology and fibrinolytic response in women taking oral contraceptive pills. Malaysian Journal of Reproductive Health 5(2): 57–60. Dec. 1987.
235. JAGDEO, T.P. Contraceptive prevalence in Montserrat. New York, International Planned Parenthood Federation, Western Hemisphere Region, 1985. (IPPF/WHR Caribbean Contraceptive Prevalence Surveys No. 2) 152 p.
236. JAGDEO, T.P. Contraceptive prevalence in St. Kitts-Nevis. New York, International Planned Parenthood Federation, Western Hemisphere Region, 1985. 126 p.
237. JAGDEO, T.P. Contraceptive prevalence in Grenada. New York, International Planned Parenthood Federation, Western Hemisphere Region, 1987. (IPPF/WHR Caribbean Contraceptive Prevalence Surveys No. 3) 169 p.
238. JANOWITZ, B., BAILEY, P., OCHOA, J., and SUAZO, M. Contraceptive use and fertility in Honduras, 1981–84. Studies in Family Planning 18(5): 291–301. Sep.-Oct. 1987.
239. JELLIFFE, D.B. and JELLIFFE, E.F. Lactation amenorrhoea: an important present-day component of family planning programmes. Journal of Tropical Pediatrics 31(5): 240–241. Oct. 1985.
240. JICK, H., PORTER, J., and ROTHMAN, K.J. Oral contraceptives and nonfatal stroke in healthy young women. Annals of Internal Medicine 89(1): 58–60. Jul. 1978.
241. JICK, S.S., WALKER, A.M., STERGACHIS, A., and JICK, H. Oral contraceptives and breast cancer. British Journal of Cancer 59(4): 618–621. Apr. 1989.
242. JOHNSON, S.R. The epidemiology and social impact of premenstrual symptoms. Clinical Obstetrics and Gynecology 30(2): 367–376. Jun. 1987.
243. JONES, E.F. The availability of contraceptive services. Voorburg, Netherlands, International Statistical Institute, Jul. 1984. (WFS Comparative Studies No. 37) 99 p.
244. JONES, H.W., 3rd. Cervical intraepithelial neoplasia. In: Jones, H.W., 3rd, Wentz, A.C., and Burnett, L.S. Novak's Textbook of Gynecology. 11th ed. Baltimore, Williams & Wilkins, 1988. p. 643–678.
245. JONES, H.W., 3rd. Epithelial ovarian cancer. In: Jones, H.W., 3rd, Wentz, A.C., and Burnett, L.S. Novak's Textbook of Gynecology. 11th ed. Baltimore, Williams & Wilkins, 1988. p. 792–830.
246. JONES, H.W., 3rd. Invasive cancer of the cervix. In: Jones, H.W., 3rd, Wentz, A.C., and Burnett, L.S. Novak's Textbook of Gynecology. 11th ed. Baltimore, Williams & Wilkins, 1988. p. 679–715.
247. JUDD, H.L. and MELDRUM, D.R. Physiology and pathophysiology of menstruation and menopause. In: Romney, S.L., Gray, M.J., Little, A.B., Merrill, J.A., Quilligan, E.J., and Stander, R.W. Gynecology and obstetrics: the health care of women. 2nd ed. New York, McGraw-Hill, 1981. p. 885–907.
248. JUDD, S.J. and KERIN, J. Contraception and diabetes mellitus. Clinical Reproduction and Fertility 4(5): 297–304. Oct. 1986.
249. KALLIO, H. and RHEN, K. The contraceptive effects of a new low-dose combination type oral contraceptive. Current Medical Research and Opinion 5(6): 444–449. 1978.
250. KAMNUANSILPA, P. and CHAMRATRITHIRONG, A. Contraceptive use and fertility in Thailand: results from the 1984 Contraceptive Prevalence Survey. Bangkok, National Institute of Development Administration, Research Center; Mahidol University, Institute for Population and Social Research; and Ministry of Public Health, National Family Planning Program, 1985. 154 p.
251. KAUFMAN, D.W., SHAPIRO, S., SLONE, D., ROSENBERG, L., MIETTINEN, O.S., STOLLEY, P.D., KNAPP, R.C., LEAVITT, T., Jr., WATRING, W.G., and ROSENSHEIN, N.B. Decreased risk of endometrial cancer among oral-contraceptive users. New England Journal of Medicine 303(18): 1045–1047. Oct. 30, 1980.
252. KAY, C.R. Malignant melanoma and oral contraceptives. [Letter] British Journal of Cancer 44(3): 479. Sep. 1981.
* 253. KAY, C.R. Progestogens and arterial disease—evidence from the Royal College of General Practitioners' study. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 762–765. Mar. 15, 1982.
254. KAY, C.R. and HANNAFORD, P.C. Breast cancer and the pill—a further report from the Royal College of General Practitioners' Oral Contraception Study. British Journal of Cancer 58: 675–680. 1988.
255. KELSEY, J.L. and BERKOWITZ, G.S. Breast cancer epidemiology. Cancer Research 48(20): 5615–5623. Oct. 15, 1988.
256. KELSEY, J.L., LIVOLSI, V.A., HOLFORD, T.R., FISCHER, D.B., MOSTOW, E.D., SCHWARTZ, P.E., O'CONNOR, T., and WHITE, C. A case-control study of cancer of the endometrium. American Journal of Epidemiology 116(2): 333–42. Aug. 1982.
257. KENDRICK, J.S. and ORY, R.W. Risks and benefits of using oral contraceptives. Presented at the 7th European Sterility Congress, Monte Carlo, Sep. 1984. 13 p.
258. KENNEDY, K.I., RIVERA, R., and MCNEILLY, A.S. Consensus statement on the use of breastfeeding as a family planning method. Presented at the Bellagio Consensus Conference on Lactational Infertility, Bellagio, Italy, Aug. 1988. 18 p. (To be published by Contraception)
259. KETTING, E. The relative reliability of oral contraceptives: findings of an epidemiological study. Contraception 37(4): 343–348. Apr. 1988.
260. KHAW, K.-T. and PEART, W.S. Blood pressure and contraceptive use. British Medical Journal 285(6339): 403–407. Aug. 7, 1982.
261. KHOO, S.K. Cancer risks and the contraceptive pill: what is the evidence after nearly 25 years of use? Medical Journal of Australia 144(4): 185–190. Feb. 17, 1986.
262. KISTNER, R.W. The oviduct. In: Gynecology principles and practice. 4th ed. Chicago, Year Book Medical Publishers, 1986. p. 249–287.
263. KLEINBERG, D.L. Prolactin and breast cancer. New England Journal of Medicine 316(5): 269–271. Jan. 29, 1987.
264. KOETSAWANG, S. The effects of contraceptive methods on the quality and quantity of breast milk. International Journal of Gynaecology and Obstetrics 25(Suppl.): 115–127. 1987.
265. KOETSAWANG, S. and SRISUPANDIT, S. Clinical trial of low-dose oral contraceptive pill containing 0.75 mg. lynestrenol and 0.0375 mg. ethinyl estradiol. Journal of the Asian Federation of Obstetrics and Gynecology 5(4): 28–32. Jul. 1977.
266. KOUTSKY, L.A., GALLOWAY, D.A., and HOLMES, K.K. Epidemiology of genital human papillomavirus infection. Epidemiologic Reviews 10: 122–163. 1988.
267. KRUEGER, D.E., ELLENBERG, S.S., BLOOM, S., et al. Fatal

myocardial infarction and the role of oral contraceptives. American Journal of Epidemiology 111(6): 655–674. Jun. 1980.
268. KÜHNE, F. Kontrazeption in der Schweiz. [Contraception in Switzerland: a sociological study of contraceptive usage and attitudes toward abortion among Swiss married couples.][SWI] Hedingen, Switzerland, Franz Kuhne, 1984. 339 p.
269. KUTNER, S.J. and BROWN, W.L. Types of oral contraceptives, depression, and premenstrual symptoms. Journal of Nervous and Mental Disease 155(3): 153–162. Sep. 1972.
270. LA ROSA, J.C. Atherosclerotic risk factors in cardiovascular disease. Journal of Reproductive Medicine 31(9, Suppl.): 906–912. Sep. 1986.
271. LA VECCHIA, C., DECARLI, A., FASOLI, M., FRANCESCHI, S., GENTILE, A., NEGRI, E., PARAZZINI, F., and TOGNONI, G. Oral contraceptives and cancers of the breast and of the female genital tract: interim results from a case-control study. British Journal of Cancer 54(2): 311–317. Aug. 1986.
272. LABBOK, M.H. Contraception during lactation: considerations in advising the individual and in formulating programme guidelines. Journal of Biosocial Science 9(Suppl.): 55–66. 1985.
* 273. LAING, J.E. Continuation and effectiveness of contraceptive practice: a cross-sectional approach. Studies in Family Planning 16(3): 138–153. May-Jun. 1985.
274. LANDGREN, B.-M. and DICZFALUSY, E. Hormonal consequences of missing the pill during the first two days of three consecutive artificial cycles. Contraception 29(5): 437–446. May 1984.
* 275. LAUKARAN, V.H. Contraceptive choices for lactating women: suggestions for postpartum family planning. Studies in Family Planning 12(4): 156–163. Apr. 1981.
276. LAW, C. The male factor in human papillomavirus infection and cervical malignancy. Healthright 7(1): 14–17. Nov. 1987.
277. LAWSON, J.S., YULIANO, S.E., PASQUALE, S.A., and OSTERMAN, J.J. Optimum dosage of an oral contraceptive: a report from the study of seven combinations of norgestimate and ethinyl estradiol. American Journal of Obstetrics and Gynecology 134(3): 315–320. Jun. 1, 1979.
* 278. LAYDE, P.M., BERAL, V., and KAY, C.R. Further analyses of mortality in oral contraceptive users: Royal College of General Practitioners' Oral Contraception Study. Lancet 1(8219): 541–546. Mar. 7, 1981.
* 279. LAYDE, P.M., ORY, H.W., BERAL, V., and KAY, C.R. Incidence of arterial disease among oral contraceptive users: Royal College of General Practitioners' Oral Contraception Study. Journal of the Royal College of General Practitioners 33(247): 75–82. Feb. 1983.
280. LE, M.-G., BACHELOT, A., DOYON, F., KRAMAR, A., and HILL, C. Oral contraceptive use and breast or cervical cancer: preliminary results of a French case-control study. In: Wolff, J.-P. and Scott, J.S., eds. Hormones and sexual factors in human cancer aetiology. Amsterdam, Excerpta Medica, 1984. p. 139–147.
281. LEE, N.C., ROSERO-BIXBY, L., OBERLE, M.W., GRIMALDO, C., WHATLEY, A.S., and ROVIRA, E.Z. A case-control study of breast cancer and hormonal contraception in Costa Rica. Journal of the National Cancer Institute 79(6): 1247–1254. Dec. 1987.
282. LEES, A.W., BURNS, P.E., and GRACE, M. Oral contraceptives and breast disease in premenopausal northern Albertan women. International Journal of Cancer 22(6): 700–707. Dec. 15, 1978.
283. LERIDON, H. and TOULEMON, L. La contraception en France: pilule et stérilet. [Contraception in France: pills and sterilization.] [FRE] Population and Societes 228: 1–4. Oct. 1988.
284. LINOS, A., O'FALLON, W.M., WORTHINGTON, J.W., and KURLAND, L.T. Case-control study of rheumatoid arthritis and prior use of oral contraceptives. Lancet 1(8337): 1299–1300. Jun. 11, 1983.
285. LIPNICK, R.J., BURING, J.E., HENNEKENS, C.H., ROSNER, B., WILLETT, W., BAIN, C., STAMPFER, M.J., COLDITZ, G.A., PETO, R., and SPEIZER, F.E. Oral contraceptives and breast cancer: a prospective cohort study. Journal of the American Medical Association 255(1): 58–61. Jan. 3, 1986.
286. LIPSETT, M.B. and LIPPMAN, M.E. Endocrine responsive cancers of man. In: Williams, R.H., ed. Textbook of endocrinology. 6th ed. Philadelphia, W.B. Saunders, 1981. p. 1213–1227.
287. LOBO, R.A. Lipids, clotting factors, and diabetes: endogenous risk factors for cardiovascular disease. American Journal of Obstetrics and Gynecology 158(6, Suppl. 2): 1584–1591. Jun. 1988.
* 288. LONDON, K., CUSHING, J., CLELAND, J., ANDERSON, J.E., MORRIS, L., MOORE, S.H., and RUTSTEIN, S.O. Fertility and family planning surveys: an update. Population Reports, Series M, No. 8. Baltimore, Johns Hopkins University, Population Information Program, Sep.-Oct. 1985. 60 p.
289. LONGSTRETH, W.T., Jr., KOEPSELL, T.D., YERBY, M.S., and VAN BELLE, G. Risk factors for subarachnoid hemorrhage. Stroke 16(3): 377–385. May-Jun. 1985.
* 290. LONGSTRETH, W.T. and SWANSON, P.D. Oral contraceptives and stroke. Stroke 15(4): 747–750. Jul.-Aug. 1984.
291. LOUV, W.C., AUSTIN, H., PERLMAN, J., and ALEXANDER, W.J. Oral contraceptive use and the risk of chlamydial and gonococcal infections. American Journal of Obstetrics and Gynecology 160(2): 396–402. Feb. 1989.
292. LYON, J.L., GARDNER, J.W., WEST, D.W., STANISH, W.M., and HEBERTSON, R.M. Smoking and carcinoma in situ of the uterine cervix. American Journal of Public Health 73(5): 558–562. May 1983.
293. MACDONALD, H.N. Smoking and oral contraception in cancer of the cervix. [Letter] Lancet 2(8305): 989. Oct. 30, 1962.
294. MACMAHON, B., COLE, P., LIN, T.M., LOWE, C.R., MIRRA, A.P., RAVNIHAR, B., SALBER, E.J., VALAORAS, V.G., and YUASA, S. Age at first birth and breast cancer risk. Bulletin of the World Health Organization 43(2): 209–221. 1970.
295. MACMAHON, B. and PUGH, T.F. Epidemiology: principles and methods. Boston, Little, Brown, 1970. 376 p.
* 296. MANN, J.I. Progestogens in cardiovascular disease: an introduction to the epidemiologic data. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 752–757. Mar. 15, 1982.
* 297. MANN, J.I. and INMAN, W.H.W. Oral contraceptives and death from myocardial infarction. British Medical Journal 2(5965): 245–248. May 3, 1975.
* 298. MANN, J.I., VESSEY, M.P., THOROGOOD, M., and DOLL, R. Myocardial infarction in young women with special reference to oral contraceptive practice. British Medical Journal 2(5965): 241–245. May 3, 1975.
299. MASER, J. Triphasic oral contraceptives. On Continuing Practice 10(2): 7–9. Apr. 1983.
300. MASIRONI, R. and ROTHWELL, K. Smoking in developing countries (3). Geneva, World Health Organization, 1985. 56 p. (Mimeo)
301. MASSIL, H.Y. and O'BRIEN, P.M.S. Approach to the management of premenstrual syndrome. Clinical Obstetrics and Gynecology 30(2): 443–452. Jun. 1987.
302. MAUSNER, J.S. and BAHN, A.K. Epidemiology: an introductory text. Philadelphia, W.B. Saunders, 1974. 377 p.
303. MCCANN, M.F. The effect of a progestogen-only oral contraceptive (lynestrenol 0.5 mg) on lactation. Presented at a Symposium on Lactation and Birthspacing, Mexico City, Mexico, Aug. 8, 1984. 18 p.
* 304. MCCANN, M.F., LISKIN, L.S., PIOTROW, P.T., RINEHART, W., and FOX, G. Breast-feeding, fertility, and family planning. Population Reports, Series J, No. 24. Baltimore, Johns Hopkins University, Population Information Program, Mar. 1984 (Rev.) 52 p.
305. MCGOWAN, L., PARENT, L., LEDNAR, W., and NORRIS, H.J. The woman at risk for developing ovarian cancer. Gynecologic Oncology 7(3): 325–344. Jun. 1979.
306. MCLAUGHLIN, L. The pill, John Rock, and the church: the biography of a revolution. Boston, Little, Brown, 1982. 243 p.
307. MCPHERSON, K. Latent effect of oral contraceptives on breast cancer. Journal of the American Medical Association 260(9): 1240–1241. Sep. 2, 1988.
* 308. MCPHERSON, K. and DRIFE, J.O. The pill and breast cancer: why the uncertainty? British Medical Journal 293(6549): 709–710. Sep. 20, 1986.
309. MCPHERSON, K., NEIL, A., VESSEY, M.P., and DOLL, R. Oral contraceptives and breast cancer. [Letter] Lancet 2(8364): 1414–1415. Dec. 17, 1983.
* 310. MCPHERSON, K., VESSEY, M.P., NEIL, A., DOLL, R., JONES, L., and ROBERTS, M. Early oral contraceptive use and breast cancer: results of another case-control study. British Journal of Cancer 56(5): 653–660. November 1987.
311. MCTIERNAN, A. and THOMAS, D.B. Evidence for a protective effect of lactation on risk of breast cancer in young women. American Journal of Epidemiology 124(1): 353–358. Sep. 1986.
312. MEADE, T.W. Effects of progestogens on the cardiovascular system. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 776–780. Mar. 15, 1982.
* 313. MEADE, T.W., GREENBERG, G., and THOMPSON, S.G. Progestogens and cardiovascular reactions associated with oral contraceptives and a comparison of the safety of 50- and 30-µg oestrogen preparations. British Medical Journal 280(6224): 1157–1161. May 10, 1980.
314. MEARS, E. and GRANT, E.C. "Anovlar" as an oral contraceptive. British Medical Journal 2: 75–79. Jul. 14, 1962.
315. MEASHAM, A.R., KHAN, A.R., MEASHAM, C.D., KHANUM, F., and AKBAR, J. Use-effectiveness of standard-dose and low-dose oral contraceptives in Dacca. International Journal of Gynaecology and Obstetrics 18(5): 354–356. 1980.
* 316. MEIRIK, O. and FARLEY, T.M.M. Evidence that contraceptives such as OCs affect HIV transmission. Jan. 31, 1989. 11 p. (Unpublished)
317. MEIRIK, O., FARLEY, T.M.M., LUND, E., ADAMI, H.-O., CHRISTOFFERSEN, T., and BERGSJÖ, P. Breast cancer and oral contraceptives: patterns of risk among parous and nulliparous women—further analysis of the Swedish-Norwegian material. Contraception 39(5): 471–475. May 1989.
318. MEIRIK, O., LUND, E., ADAMI, H.-O., BERGSTROM, R., CHRISTOFFERSEN, T., and BERGSJÖ, P. Oral contraceptive use and breast cancer in young women: a joint national case-control study in Sweden and Norway. Lancet 2(8508): 650–654. Sep. 20, 1986.
319. MELBYE, M., NJELESANI, E.K., BAYLEY, A., MUKELABAI, K., MANUWELE, J.K., BOWA, F.J., CLAYDEN, S.A., LEVIN, A., BLATTNER, W.A., WEISS, R.A., TEDDER, R., and BIGGAR, R.J. Evidence for heterosexual transmission and clinical manifestations of human immunodeficiency virus infection and related conditions in Lusaka, Zambia. Lancet 2(8516): 1113–1115. Nov. 15, 1986.
320. MILLER, A.B. and BULBROOK, R.D. UICC multidisciplinary project on breast cancer: the epidemiology, aetiology and prevention of breast cancer. International Journal of Cancer 37(2): 173–177. Feb. 1986.
321. MILLER, D.R., ROSENBERG, L., KAUFMAN, D.W., SCHOTTENFELD, D., STOLLEY, P.D., and SHAPIRO, S. Breast cancer risk in relation to early oral contraceptive use. Obstetrics and Gynecology 68(6): 863–868. Dec. 1986.
* 322. MILLER, D.R., ROSENBERG, L., KAUFMAN, D.W., STOLLEY, P., WARSHAUER, M.E., and SHAPIRO, S. Breast cancer before age 45 and oral contraceptive use: new findings. American Journal of Epidemiology 129(2): 269–280. Feb. 1989.
323. MILLER, L.G. Update on the new triphasic oral contraceptives. [Letter] Clinical Pharmacy 4(1): 24–25. Jan.-Feb. 1985.
324. MISHELL, D.R. Noncontraceptive health benefits of oral steroidal contraceptives. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 809–816. Mar. 15, 1982.
* 325. MISHELL, D.R., Jr. Use of oral contraceptives in women of older reproductive age. American Journal of Obstetrics and Gynecology 158(6, Pt. 2): 1652–1657. Jun. 1988.
326. MOGGIA, A.V. Contraception with levonorgestrel, 0.15 mg, and ethinyl estradiol, 0.03 mg.: clinical studies in Latin America. Journal of Reproductive Medicine 28(Suppl. 1): 77–80. Jan. 1983.
327. MOLLOY, B.G., COULSON, K.A., LEE, J.M., and WATTERS, J.K. "Missed pill" conception: fact or fiction? British Medical Journal 290(6480): 1474–1475. May 18, 1985.
328. MONTEITH, R.S., ANDERSON, J.E., MASCARIN, F., and MORRIS, L. Contraceptive use and fertility in the Republic of Panama. Studies in Family Planning 12(10): 331–340. Oct. 1981.
329. MONTEITH, R.S., ANDERSON, J.E., PINEDA, M.A., SANTISO, R., and OBERLE, M. Contraceptive use and fertility in Guatemala. Studies in Family Planning 16(5): 279–288. Sep.-Oct. 1985.
330. MOOS, R.H. Psychological aspects of oral contraceptives. Archives of General Psychiatry 19: 87–94. Jul. 1968.
331. MORENO A., J. and ROWAN, A.J. A comparative study of Norinyl 1/35 versus Brevicon in Panama City, Panama. Contraception 36(6): 615–625. Dec. 1987.
332. MORIGI, E.M. and PASQUALE, S.A. Clinical experience with a low dose oral contraceptive containing norethisterone and ethinyl oestradiol. Current Medical Research and Opinion 5(8): 655–662. 1978.
333. MOROCCO. MINISTERE DE LA SANTE PUBLIQUE (MSP). Enquête nationale sur la fécondité et la planification familiale au Maroc 1979–80. Rapport national. Vol. 1—présentation du pays et méthodologie de l'enquête. [Morocco National Fertility and Family Planning Survey, 1979–80. National report. Vol. 1—country presentation and survey methodology.][FRE] [Rabat, Morocco], MSP, 1984. 181 p.
334. MOROCCO. MINISTERE DE LA SANTE PUBLIQUE (MSP), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Enquête Nationale sur la Planification Familiale, la Fecondite et la Santé de la Population au Maroc (ENPS) 1987: rapport préliminaire. Rev. [National Survey of Family Planning, Fertility and Health of the Population of Morocco 1987: preliminary report. Rev.][FRE] [Rabbat, Morocco and Columbia, Maryland], MSP and IRD, Feb. 1988. 20 p.
335. MORRIS, L., LEWIS, G., POWELL, D.L., ANDERSON, J., WAY, A., CUSHING, J., and LAWLESS, G. Contraceptive Prevalence Surveys: a new source of family planning data. Population Reports, Series M, No. 5. Baltimore, Johns Hopkins University, Population Information Program, May-Jun. 1981. 40 p.
336. MORROW, C.P. and HART, W.R. Ovaries. In: Romney, S.L., Gray, M.J., Little, A.B., Merrill, J.A., Quilligan, E.J., and Stander, R.W., eds. Gynecology and obstetrics: the health care of women. 2nd ed. New York, McGraw-Hill, 1981. p. 1123–1181.
337. MOSHER, W.D. and BACHRACH, C.A. Contraceptive use. Vital and Health Statistics, Series 23, No. 12. Sep. 1986. 52 p.
338. MUNZ, R. Leben mit Kindern: Wunsch und Wirklichkeit. [Living with children: desire and reality.][GER] Vienna, Franz Deuticke Verlagsgesellschaft, 1985. 385 p.
339. MUSEY, V.C., COLLINS, D.C., MUSEY, P.I., MARTINO-SALTZMAN, D., and PREEDY, J.R.K. Long-term effect of a first pregnancy on the secretion of prolactin. New England Journal of Medicine 316(5): 229–234. Jan. 29, 1987.
340. NDIAYE, S., SARR, I., and AYAD, M. Sénégal: Enquête Démographique et de Santé au Sénégal 1986. [Senegal Demographic and Health Survey 1986.][FRE] Dakar, Senegal and Columbia, Maryland, Senegal Ministry of Economics and Finance and Institute for Resource Development/Westinghouse, Mar. 1988. 173 p.
341. NEUBERGER, J., FORMAN, D., DOLL, R., and WILLIAMS, R. Oral contraceptives and hepatocellular carcinoma. British Medical Journal 292(6532): 1355–1357. May 24, 1986.
342. NEWHOUSE, M.L., PEARSON, R.M., FULLERTON, J.M., BOESEN, E.A.M., and SHANNON, H.S. A case control study of carcinoma of the ovary. British Journal of Preventive and Social Medicine 31(3): 148–153. Sep. 1977.
343. NILSSON, L. and SOLVELL, L. Clinical studies on oral contraceptives—a randomized, doubleblind, crossover study of 4 different preparations (Anovlar Mite, Lyndiol Mite, Ovulen, and Volidan). Acta Obstetricia et Gynecologica Scandinavica 46(Suppl. 8): 1–31. 1967.
344. NILSSON, S. Oral contraceptives during lactation: transfer of contraceptive steroids and estradiol to human milk. [Abstract] Doctoral dissertation, Uppsala University, 1978. 38 p.
345. NILSSON, S., MELLBIN, T., HOFVANDER, Y., SUNDELIN, C., VALENTIN, J., and NYGREN, K.G. Long-term follow-up of children breast-fed by mothers using oral contraceptives. Contraception 34(5): 443–457. Nov. 1986.
346. OLSSON, H., BORG, Å., EWERS, S.-B., FERNÖ, M., MÖLLER, T., and RANSTAM, J. A biological marker, strongly associated with early oral contraceptive use, for the selection of a high risk group for premenopausal breast cancer. Medical Oncology and Tumor Pharmacotherapy 3(2): 77–81. 1986.
347. OLSSON, H., MÖLLER, T.R., RANSTAM, J., BORG, Å., and FERNÖ, M. Early oral contraceptive use as a prognostic factor in breast cancer. Anticancer Research 8: 29–32. 1988.
348. OLSSON, H., OLSSON, M.L., MÖLLER, T.R., RANSTAM, J., and HOLM, P. Oral contraceptive use and breast cancer in young women in Sweden. [Letter] Lancet 1(8431): 748–749. Mar. 30, 1985.
349. ONNIS, A., MARCHETTI, M., and GRAZIOTTIN, A. Hormones and risk of breast cancer. European Journal of Gynaecological Oncology 4(1): 13–17. 1983.
350. ORY, H. Functional ovarian cysts and oral contraceptives: negative association confirmed surgically. Journal of the American Medical Association 228(1): 68–69. Apr. 1, 1974.
351. ORY, H., COLE, P., MACMAHON, B., and HOOVER, R. Oral contraceptives and reduced risk of benign breast diseases. New England Journal of Medicine 294(8): 419–422. Feb. 19, 1976.
* 352. ORY, H.W. The noncontraceptive health benefits from oral contraceptive use. Family Planning Perspectives 14(4): 182–184. Jul.-Aug. 1982.
353. ORY, H.W., FORREST, J.D., and LINCOLN, R. Making choices: evaluating the health risks and benefits of birth control methods. New York, Alan Guttmacher Institute, 1983. 72 p.
354. ORY, H.W. and WOMEN'S HEALTH STUDY. Ectopic pregnancy and intrauterine contraceptive devices: new perspectives. Journal of the American College of Obstetricians and Gynecologists 57(2): 137–144. Feb. 1981.
355. OSSER, S., GULLBERG, B., LIEDHOLM, P., and SJÖBERG, N.-O. Risk of pelvic inflammatory disease among intrauterine-device users irrespective of previous pregnancy. Lancet 1(8165): 386–388. Feb. 23, 1980.
356. PAFFENBARGER, R.S., Jr., FASAL, E., SIMMONS, M.E., and KAMPERT, J.B. Cancer risk as related to use of oral contraceptives during fertile years. Cancer 39(4, Suppl.): 1887–1891. Apr. 1977.
357. PAFFENBARGER, R.S., Jr., KAMPERT, J.B., and CHANG, H.G. Characteristics that predict risk of breast cancer before and after the menopause. American Journal of Epidemiology 112(2): 258–268. Aug. 1980.
358. PAIGE, K.E. Effects of oral contraceptives on affective fluctuations associated with the menstrual cycle. Psychosomatic Medicine 33(6): 515–537. Nov. 1971.
359. PASQUALE, S.A. Rationale for a triphasic oral contraceptive. Journal of Reproductive Medicine 29(Suppl. 7): 560–567. Jul. 1984.
360. PASQUALE, S.A. and YULIANO, E. Clinical results with a new low dose oral contraceptive utilizing norethindrone/ethinyl estradiol. Contraception 12(3): 495–503. Nov. 1975.
361. PAUL, C., SKEGG, D.C.G., SHEIERS, L., and SPEARS, G.F.S. Contraceptive practice in New Zealand. New Zealand Medical Journal 101(859): 809–813. Dec. 14, 1988.
* 362. PAUL, C., SKEGG, D.C.G., SPEARS, G.F.S., and KALDOR, J.M. Oral contraceptives and breast cancer: a national study. British Medical Journal 293(6549): 723–726. Sep. 20, 1986.
363. PAULSEN, M.L., VARADAY, A., BROWN, B.W., and KALMAN, S.M. A randomized contraceptive trial comparing a daily progestogen with a combined oral contraceptive steroid. Contraception 9(5): 497–506. May 1974.
364. PEARSON, O.H., LLERENA, O., LLERENA, L., MOLINA, A., and BUTLER, T. Prolactin-dependent rat mammary cancer: a model for man? Transactions of the Assn. of American Physicians 82: 225–238. 1969.
365. PERALTA, O., DAZ, S., JUEZ, G., HERREROS, C., CASADO, M.E., SALVATIERRA, A.M., MIRANDA, P., DURN, E., and CROXATTO, H.B. Fertility regulation in nursing women: 5. Long-term influence of a low-dose combined oral contraceptive initiated at day 90 postpartum upon lactation and infant growth. Contraception 27(1): 27–38. Jan. 1983.
366. PERCIVAL-SMITH, R.K.L., MORRISON, B.J., SIZTO, R., and ABERCROMBIE, B. The effect of triphasic and biphasic oral contraceptive preparations on HDL-cholesterol and LDL-cholesterol in young women. Contraception 35(2): 179–187. Feb. 1987.
367. PERLMAN, J. Recent research on OC use and breast cancer risk. Presented at US Food and Drug Administration Fertility and Maternal Health Drugs Advisory Committee Meeting, Rockville, Maryland, Jan. 5, 1989.
368. PERU. NATIONAL INSTITUTE OF STATISTICS (NIS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD). Encuesta Demografica y de salud familiar (endes 1986): resultados preliminares. [Peru Demographic and Health Survey 1986: preliminary results.][SPA] Lima, Peru and [Columbia, Maryland], NIS and IRD, Mar. 1987. 28 p.
* 369. PETITTI, D.B. and WINGERD, J. Use of oral contraceptives,

cigarette smoking, and risk of subarachnoid haemorrhage. Lancet 2(8083): 234–236. Jul. 29, 1978.
* 370. PETITTI, D.B., WINGERD, J., PELLEGRIN, F., and RAMCHARAN, S. Oral contraceptives, smoking, and other factors in relation to risk of venous thromboembolic disease. American Journal of Epidemiology 108(6): 480–485. Dec. 1978.
371. PIKE, M.C. Breast cancer and oral contraceptives. [Letter] Lancet 2(8465): 1180–1181. Nov. 23, 1985.
372. PIKE, M.C. Fertility and its effects on health. In: Diggory, P., Potts, M., and Teper, S., eds. Natural human fertility: social and biological determinants. London, MacMillan Press, 1987. p. 161–189.
* 373. PIKE, M.C. and CHILVERS, C. Hormonal contraception and breast cancer. In: Wolff, J.-P. and Scott, J.S., eds. Hormones and sexual factors in human cancer aetiology. Amsterdam, Excerpta Medica, 1984. p. 83–99.
374. PIKE, M.C., HENDERSON, B.E., KRAILO, M.D., DUKE, A., and ROY, S. Breast cancer in young women and use of oral contraceptives: possible modifying effect of formulation and age at use. Lancet 2(8356): 926–930. Oct. 22, 1983.
375. PINCUS, G., ROCK, J., GARCIA, C.-R., RICE-WRAY, E., PANIAGUA, M., and RODRIGUEZ, I. Fertility control with oral medication. American Journal of Obstetrics and Gynecology 75(6): 1333–1346. Jun. 1958.
376. PINCUS, G., ROCK, J., and GARCIA, C.R. Effects of certain 19-nor steroids upon reproductive processes. Annals of the New York Academy of Sciences 71: 677–690. Jul. 30, 1958.
377. PINOTTI, J.A., TEIXEIRA, L.C., PISANI, R.C.B., and BASTOS, S.R. Estrogen receptors in breast cancer—therapeutic response to the treatment of recurrences. International Journal of Gynaecology and Obstetrics 25(2): 127–131. Apr. 1987.
378. PIOTROW, P.T. and LEE, C.M. Oral contraceptives—50 million users. Population Reports, Series A, No. 1. Washington, D.C., Population Information Program, Apr. 1974. 28 p.
379. PIPER, J.M. Oral contraceptives and cervical cancer. Gynecologic Oncology 22(2): 1–14. Sep. 1985.
380. PLUMMER, F.A., SIMONSEN, J.N., CAMERON, D.W., NDINYA-ACHOLA, J.O., GAKINYA, M., KARASIRA, P., PIOT, P., RONALD, A.R., KIMATA, J., D'COSTA, L.J., and NGUGI, E.N. Genital ulcers and oral contraceptives facilitate male-female transmission of HIV. May 1987. 17 p. (Unpublished)
381. PORTER, J.B., HUNTER, J.R., DANIELSON, D.A., JICK, H., and STERGACHIS, A. Oral contraceptives and nonfatal vascular disease—recent experience. Obstetrics and Gynecology 59(3): 299–302. Mar. 1982.
* 382. PORTER, J.B., HUNTER, J.R., JICK, H., and STERGACHIS, A. Oral contraceptives and nonfatal vascular disease. Obstetrics and Gynecology 66(1): 1–4. Jul. 1985.
383. PORTER, J.B., JICK, H., and WALKER, A.M. Mortality among oral contraceptive users. Obstetrics and Gynecology 70(1): 29–32. Jul. 1987.
384. POTTS, M. Oral contraceptives and breast cancer. Presented at US Food and Drug Administration Fertility and Maternal Health Drugs Advisory Committee Meeting, Rockville, Maryland, Jan. 5, 1989.
385. POTTS, M., VLUGT, T. VAN DER, PIOTROW, P.T., GAIL, L.J., and HUBER, S.C. Advantages of orals outweigh disadvantages. Population Reports, Series A, No. 2. Washington, D.C., Population Information Program, Mar. 1975. 24 p.
* 386. PRENTICE, R.L. and THOMAS, D.B. On the epidemiology of oral contraceptives and disease. In: Klein, G. and Weinhouse, S., eds. Advances in cancer research. Orlando, Florida, Academic Press, 1987. (Vol. 49) p. 285–401.
387. PRESTON, S.N. A report of a collaborative dose-response clinical study using decreasing doses of combination oral contraceptives. Contraception 6(1): 17–35. Jul. 1972.
388. PRESTON, S.N. A report of the correlation between the pregnancy rates of low estrogen formulations and pill-taking habits of females studied. Journal of Reproductive Medicine 13(2): 75–77. Aug. 1974.
389. PRIMARY HEALTH CARE OPERATIONS RESEARCH (PRICOR). Household survey identifies patterns of use and payment for health care: Brazil; community financing of primary health care. PRICOR Interim Report No. 12. Sep. 1985. 2 p.
390. PRSIC, J. and KICOVIC, P.M. Preliminary experience with a new low-oestrogen content combined oral contraceptive. Current Medical Research and Opinion 2(4): 204–210. 1974.
391. QUINN, T.C., GLASSER, D., CANNON, R.O., MATUSZAK, D.L., DUNNING, R.W., KLINE, R.L., CAMPBELL, C.H., ISRAEL, E., FAUCI, A.S., and HOOK, E.W., 3rd. Human immunodeficiency virus infection among patients attending clinics for sexually transmitted diseases. New England Journal of Medicine 318(4): 197–203. Jan. 28, 1988.
* 392. RAMCHARAN, S., PELLEGRIN, F.A., RAY, R., and HSU, J.-P. The Walnut Creek Contraceptive Drug Study: a prospective study of the side effects of oral contraceptives. Vol. 3. An interim report—a comparison of disease occurrence leading to hospitalization or death in users and nonusers of oral contraceptives. Bethesda, Maryland, US Department of Health and Human Services, National Institute of Child Health and Human Behavior, Jan. 1981. (Center for Population Research Monograph; NIH Publication No. 81–564) 349 p.
393. RANDLE, N. Antibiotic- and anticonvulsant-induced oral contraceptive failure. Journal of Pharmacy Technology 1(6): 246–249. Nov.-Dec. 1985.
* 394. RAVENHOLT, R.T., KESSEL, E., SPEIDEL, J.J., TALWAR, P.P., and LEVINGKI, M.J. A comparison of symptoms associated with the use of three oral contraceptives: a double blind crossover study of Ovral, Norinyl, and Norlestrin. [1977]. 31 p. (Unpublished)
395. RAVENHOLT, R.T. and PIOTROW, P.T. Use of oral contraceptives in developing countries. Pakistan Journal of Medical Research 8(3): 213–241. Jul. 1969.
396. RAVENHOLT, R.T., PIOTROW, P.T., and SPEIDEL, J.J. Use of oral contraceptives: a decade of controversy. International Journal of Gynaecology and Obstetrics 8(6, Pt. 2): 941–956. Nov. 1970.
397. RAVNIHAR, B., PRSMIC AKELJ, M., KOMELJ, K., and STARE, J. A case-control study of breast cancer in relation to oral contraceptive use in Slovenia. Neoplasma 35(1): 109–121. 1988.
398. REESE, M. and HATCHER, R.A. Instructions for minipill users. Contraceptive Technology Update 6(1): 21. Jan. 1985.
399. RICE-WRAY, E., SCHULZ-CONTRERAS, M., GUERRERO, I., and ARANDA-ROSELL, A. Long-term administration of norethindrone in fertility control. Journal of the American Medical Association 180(5): 355–358. May 5, 1962.
400. RICHART, R.M., BECKER, T.M., FERENCZY, A.M., REID, R., and TOWNSEND, D.E. HPV DNA: quicker ways to discern viral types. Contemporary OB/GYN 33(4): 112–133. Apr. 1989.
401. RINEHART, W. Minipill—a limited alternative for certain women. Population Reports, Series A, No. 3. Washington, D.C., Population Information Program, Sep. 1975. 15 p.
402. RINEHART, W., KOLS, A., and MOORE, S.H. Healthier mothers and children through family planning. Population Reports, Series J, No. 27. Baltimore, Johns Hopkins University, Population Information Program, May-Jun. 1984. 40 p.
403. RIVERA, R., ALMONTE, H., ARREOLA, M., LOPEZ, F., MONARREZ, G., NAVARRO, C., ORTIZ, E., PERKIN, G.W., and RUIZ, R. The effects of three different regimens of oral contraceptives and three different intrauterine devices on the levels of hemoglobin, serum iron and iron binding capacity in anemic women. Contraception 27(3): 311–327. Mar. 1983.
404. ROBERTSON, E.M., ed. Identify and manage potentially serious OC/drug interactions. Contraceptive Technology Update 8(7): 90–92. Jul. 1987.
405. ROBERTSON, E.M., ed. OC use for one year or more cuts endometrial cancer risk. Contraceptive Technology Update 8(4): 47–48. Apr. 1987.
406. ROBERTSON, E.M., ed. OCs protect against ovarian cancer: effect may last as long as 15 years. Contraceptive Technology Update 8(4): 48–49. Apr. 1987.
407. ROBLES, R.R., MARTINEZ, R.E., VERA, M., and ALEGRIA, M. Sociocultural factors associated with contraceptive use in Puerto Rico. PAHO Bulletin 21(4): 395–404. 1987.
408. ROBLES, R.R., MARTINEZ, R.E., VERA, M., and ALEGRIA, M. Sociocultural factors associated with contraceptive use in Puerto Rico. Bulletin of the Pan American Health Organization 21(4): 395–404. 1987.
409. ROCHAT, R.W., STRAUSS, L.T., SPECKHARD, M., and SENANAYAKE, P. Contraception during lactation—doctors' worldwide practice. IPPF Medical Bulletin 15(3): 4. Jun. 1981.
410. ROCK, J., PINCUS, G., and GARCIA, C.R. Effects of certain 19-nor steroids on the normal human menstrual cycle. Science 124(3227): 891–893. Nov. 1, 1956.
411. ROHAN, T.E. and MCMICHAEL, A.J. Oral contraceptive agents and breast cancer: a population-based case-control study. Medical Journal of Australia 149(10): 520–526. Nov. 21, 1988.
412. ROOKS, J.B., ORY, H.W., ISHAK, K.G., STRAUSS, L.T., GREENSPAN, J.R., HILL, A.P., and TYLER, C.W., Jr. Epidemiology of hepatocellular adenoma: the role of oral contraceptive use. [ENG, summary in FRE] In: Institut National de la Sante et de la Recherche Medicale (INSERM). Conseil Superieur de l'Information Sexuelle. A regulation of fertility: evaluation and perspectives. Paris, INSERM, 1979. p. 131–146.
* 413. ROSENBERG, L., KAUFMAN, D.W., HELMRICH, S.P., MILLER, D.R., STOLLEY, P.D., and SHAPIRO, S. Myocardial infarction and cigarette smoking in women younger than 50 years of age. Journal of the American Medical Association 253(20): 2965–2969. May 24–31, 1985.
414. ROSENBERG, L., MILLER, D.R., KAUFMAN, D.W., HELMRICH, S.P., STOLLEY, P.D., SCHOTTENFELD, D., and SHAPIRO, S. Breast cancer and oral contraceptive use. American Journal of Epidemiology 119(2): 167–176. Feb. 1984.
415. ROSENBERG, L., SHAPIRO, S., SLONE, D., KAUFMAN, D.W., HELMRICH, S.P., MIETTINEN, O.S., STOLLEY, P.D., ROSENSHEIN, N.B., SHOTTENFELD, D., and ENGLE, R.L., Jr. Epithelial ovarian cancer and combination oral contraceptives. Journal of the American Medical Association 247(23): 3210–3212. Jun. 18, 1982.
416. ROSERO-BIXBY, L. and OBERLE, M. Tabaquismo en la mujer Costarricense, 1984–85. [Tobacco use in Costa Rican women.] [SPA] Ciencias Sociales 35: 95–102. 1987.
417. ROY, M., MORIN, C., CASAS-CORDERO, M., and MEISELS, A. Human papillomavirus and cervical lesions. Clinical Obstetrics and Gynecology 26(4): 949–967. Dec. 1983.
418. ROYAL COLLEGE OF GENERAL PRACTITIONERS. Oral contraceptives and health: an interim report from the Oral Contraception Study of the Royal College of General Practitioners. New York, Pitman, 1974. 100 p.
419. ROYAL COLLEGE OF GENERAL PRACTITIONERS. RECORDS UNIT AND RESEARCH ADVISORY SERVICE. Oral contraception and thrombo-embolic disease. Journal of the Royal College of General Practitioners 13: 267–271. 1967.
420. ROYAL COLLEGE OF GENERAL PRACTITIONERS' ORAL CONTRACEPTION STUDY. Effect on hypertension and benign breast disease of progestagen component in combined oral contraceptives. Lancet 1(8012): 624. Mar. 19, 1977.
421. ROYAL COLLEGE OF GENERAL PRACTITIONERS' ORAL CONTRACEPTION STUDY. Oral contraceptives, venous thrombosis, and varicose veins. Journal of the Royal College of General Practitioners 28(192): 393–399. Jul. 1978.
422. ROYSTON, E. and LOPEZ, A.D. On the assessment of maternal mortality. World Health Statistics Quarterly 40: 214–224. 1987.
423. RUDEL, H.W., MAQUEO, M., CALDERONE, J., and MARTINEZ-MANAUTOU, J. Safety and effectiveness of a new low-dose oral contraceptive: a three-year study of 1,000 women. Journal of Reproductive Medicine 21(2): 79–88. Aug. 1978.
424. RUSSELL, M. and RAMCHARAN, S. Oral contraceptive estrogen content and adverse effects: has a dose-response relationship been established? Canadian Family Physician 33: 445–460. Feb. 1987.
425. RYDER, N.B. and WESTOFF, C.F. Use of oral contraception in the United States, 1965. Science 153(3741): 1199–1205. Sep. 9, 1966.
426. SABRA, A. and BONNAR, J. Hemostatic system changes induced by 50 µg and 30 µg estrogen/progestogen oral contraceptives: modification of estrogen effects by levonorgestrel. Journal of Reproductive Medicine 28(Suppl. 1): 85–91. Jan. 1983.
427. SARTORETTO, J.N., ORTEGA-RECIO, J.C., MORAES, R., and NAVAS FILHO, F. Clinical studies with a low dose estrogen-progestogen combination. Contraception 15(5): 563–570. May 1977.
428. SARTWELL, P.E., MASI, A.T., ARTHES, F.G., GREENE, G.R., and SMITH, H.E. Thromboembolism and oral contraceptives: an epidemiologic case-control study. American Journal of Epidemiology 90(5): 365–380. Nov. 1969.
429. SAYED, H.A.A.H., EL-KHORAZATY, M.N., and WAY, A.A. Fertility and family planning in Egypt: 1984. Cairo, Egypt and Columbia, Maryland, National Population Council and Westinghouse Public Applied Systems, Dec. 1985. 313 p.
430. SCHATZKIN, A., GREENWALD, P., BYAR, D.P., and CLIFFORD, C.K. The dietary fat—breast cancer hypothesis is alive. Journal of the American Medical Association 261(22): 3284–3287. Jun. 9, 1989.
431. SCHELLEN, A.M.C.M. Preliminary experience with a sub-50 combined oral contraceptive, containing 35 micrograms ethinyl oestradiol and 1 mg norethisterone (NeoCon). Pharmatherapeutica 2(6): 412–415. 1980.
432. SCHIRM, A.L., TRUSSELL, J., MENKEN, J., and GRADY, W.R. Contraceptive failure in the United States: the impact of social, economic and demographic factors. Family Planning Perspectives 14(2): 68–75. Mar.-Apr. 1982.
433. SCHLESSELMAN, J.J. Cancer of the breast and reproductive tract in relation to use of oral contraceptives—a review of human studies. [Draft] Oct. 28, 1988. 44 p.
* 434. SCHLESSELMAN, J.J. Oral contraceptives in relation to cancer of the breast and reproductive tract: an epidemiological review. Presented at the 16th Current Fertility Control Symposium, London, Oct. 12–13, 1988. 25 p. (To be published by British Journal of Family Planning)
* 435. SCHLESSELMAN, J.J., STADEL, B.V., MURRAY, P., and LAI, S.-H. Breast cancer risk in relation to type of estrogen contained in oral contraceptives. Contraception 36(6): 595–613. Dec. 1987.
436. SCHWARTZ, R.W. Common gynecologic problems. In: Berkow, R., ed. The Merck manual. 14th ed. Vol. 2. Rahway, New Jersey, Merck Sharp and Dohme Research Laboratories, 1982. p. 17–25.
437. SEDLACEK, T.V., CUNNANE, M., and CARPINIELLO, V. Colposcopy in the diagnosis of penile condyloma. American Journal of Obstetrics and Gynecology 154(3): 494–496. Mar. 1986.
438. SENANAYAKE, P. (International Planned Parenthood Federation) [IPPF policies on oral contraceptives and AIDS] Personal communication, Mar. 7, 1989.
* 439. SHAPIRO, S., SLONE, D., ROSENBERG, L., and KAUFMAN, D.W. Oral-contraceptive use in relation to myocardial infarction. Lancet 1(8119): 743–747. Apr. 7, 1979.
440. SHELTON, J. (US Agency for International Development) [OC doses in Bangladesh] Personal communication, Feb. 10, 1989.
441. SHELTON, J.D. and HARRIS, J. (US Agency for International Development) [Genital ulcers, OCs, and HIV infection] Personal communication to F.A. Plummer, Jun. 10, 1987.
442. SHENFIELD, G.M. The clinical pharmacology of the oral contraceptive and drugs which alter its activity. Healthright 6(2): 27–30. Feb. 1987.
443. SHENFIELD, G.M. Drug interactions with oral contraceptive preparations. Medical Journal of Australia 144(4): 205–211. Feb. 17, 1986.
444. SIEDLECKY, S. Current usage of and attitudes towards contraception in Australia. Healthright 6(1): 7–16. Nov. 1986.
445. SILBERGELD, S., BRAST, N., and NOBLE, E.P. The menstrual cycle: a double-blind study of symptoms, mood and behavior, and biochemical variables. Psychosomatic Medicine 33(5): 411–428. Sep.-Oct. 1971.
446. SIMPSON-HEBERT, M. and HUFFMAN, S.L. The contraceptive effect of breastfeeding. Studies in Family Planning 12(4): 125–133. Apr. 1981.
* 447. SKEGG, D.C.G. Potential for bias in case-control studies of oral contraceptives and breast cancer. American Journal of Epidemiology 127(2): 205–212. Feb. 1988.
448. SKEGG, D.C.G. (University of Otago) [Breast cancer and oral contraceptives] Personal communication, Feb. 3, 1989.
* 449. SLONE, D., SHAPIRO, S., KAUFMAN, D.W., ROSENBERG, L., MIETTINEN, O.S., and STOLLEY, P.D. Risk of myocardial infarction in relation to current and discontinued use of oral contraceptives. New England Journal of Medicine 305(8): 420–424. Aug. 20, 1981.
450. SNOWBALL, S. and TAYLOR, W. Effects of short-term treatment with a combined oestrogen-progestin oral contraceptive on biliary lipids and cholesterol saturation index in young women. Journal of Steroid Biochemistry 22(2): 257–261. Feb. 1985.
451. SPAIN, NATIONAL INSTITUTE OF STATISTICS (INS). Encuesta de fecundidad 1985: avance de resultados. [Fertility survey 1985: advance results.] [SPA] [Madrid], Spain, INS, 1986. 237 p.
452. SPEIDEL, J.J., RAVENHOLT, R.T., and IRVINE, M.E. Liberalized policies for distribution of oral contraceptives. Studies in Family Planning 5(2): 62–67. Feb. 1974.
453. SPEROFF, L. Oral contraception: monophasics vs. multiphasics—is there a difference? 1988. 27 p. (Unpublished)
454. SPEROFF, L., ARCHER, D.F., and MISHELL, D.R. Multiphasic and monophasic OCs: is there a difference? [Symposium dialogue] Contemporary Ob/Gyn (Special Issue): 124–126, 129–130, 133–135, 138, 140, 142, 145. 1988.
455. SPRING, S.B. and GRUBER, J. Relationship of DNA viruses and cervical carcinoma. Journal of the National Cancer Institute 75(3): 589–590. Sep. 1985.
456. SRI LANKA, MINISTRY OF PLAN IMPLEMENTATION, DEPARTMENT OF CENSUS AND STATISTICS (DCS), and INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD/W). Sri Lanka Demographic and Health Survey 1987. [Colombo], Sri Lanka, and [Columbia, Maryland], DCS and IRD/W, Jul. 1987. 22 p.
* 457. STADEL, B.V. Oral contraceptives and cardiovascular disease: Pt. 1. New England Journal of Medicine: 305(11): 612–618. Sep. 10, 1981.
* 458. STADEL, B.V. Oral contraceptives and cardiovascular disease: Pt. 2. New England Journal of Medicine: 305(12): 672–677. Sep. 17, 1981.
* 459. STADEL, B.V., LAI, S., SCHLESSELMAN, J.J., and MURRAY, P. Oral contraceptives and premenopausal breast cancer in nulliparous women. Contraception 38(3): 287–299. Sep. 1988.
460. STADEL, B.V., RUBIN, G.L., WEBSTER, L.A., SCHLESSELMAN, J.J., and WINGO, P. Oral contraceptives and breast cancer in young women. Lancet 2(8461): 970–973. Nov. 2, 1985.
461. STADEL, B.V., RUBIN, G.L., WINGO, P.A., and SCHLESSELMAN, J.J. Oral contraceptives and breast cancer in young women. [Letter] Lancet 1(8478): 436. Feb. 22, 1986.
462. STADEL, B.V. and SCHLESSELMAN, J.J. Oral contraceptive use and the risk of breast cancer in women with a "prior" history of benign breast disease. American Journal of Epidemiology 123(3): 373–382. Mar. 1986.
463. STADEL, B.V., SCHLESSELMAN, J.J., and MURRAY, P.A. Oral contraceptives and breast cancer. [Letter] Lancet 1(8649): 1257–1258. Jun. 3, 1989.
* 464. STAMPFER, M.J., WILLETT, W.C., COLDITZ, G.A., SPEIZER, F.E., and HENNEKENS, C.H. A prospective study of past use of oral contraceptive agents and risk of cardiovascular diseases. New England Journal of Medicine 319(20): 1313–1317. Nov. 17, 1988.
465. STANLEY, K., STJERNSWARD, J. and KOROLTCHOUK, V. Women and cancer. World Health Statistics Quarterly 40(3): 267–278. 1987.
466. STEIGBIGEL, N.H., MAUDE, D.W., FEINER, C.J., HARRIS, C.A., SALTZMAN, B.R., KLEIN, R.S., et al. Heterosexual transmission of HIV infection. [Abstract] Presented at the 4th International Conference on AIDS, Stockholm, Sweden, Jun. 12–16, 1988.
467. STERN, E., FORSYTHE, A.B., and COFFELT, D.F. Steroid contraceptive use and cervical dysplasia: increased risk of progression. Science 196(4297): 1460–1462. Jun. 24, 1977.
468. STOLL, B.A. The basis of endocrine therapy. In: Endocrine therapy in malignant disease. London, W.B. Saunders, 1972. p. 111–137.
469. STOLLEY, P.D., TONASCIA, J.A., TOCKMAN, M.S., SARTWELL, P.E., RUTLEDGE, A.H., and JACOBS, M.P. Thrombosis with low-estrogen oral contraceptives. American Journal of Epidemiology 102(3): 197–208. Sep. 1975.
470. STRAUSS, L.T., SPECKHARD, M., ROCHAT, R.W., and SENANAYAKE, P. Oral contraception during lactation: a global survey of physician practice. International Journal of Gynaecology and Obstetrics 19(3): 169–175. Jun. 1981.
471. STURTEVANT, F.M. Breast cancer and oral contraceptives: critique of the proposition that high potency progestogen products confer excess risk. Biomedicine and Pharmacotherapy 38(8): 371–379. 1984.

472. SWEDEN. NATIONAL CENTRAL BUREAU OF STATISTICS (NCBS). Kvinnor och barn: intervjuer med kvinnor om familj och arbete. [Women and children: interviews with women about family and work.][SWE] Stockholm, NCBS, 1982. 101 p.

473. SWEDEN. WORLD FERTILITY SURVEY. Fertility survey in Sweden, 1981: a summary of findings. Voorburg, Netherlands, International Statistical Institute, Apr. 1984. (WFS Summary of Findings No. 43) 18 p.

474. SWYER, G.I.M. Potency of progestogens in oral contraceptives—further delay of menses data. Contraception 26(1): 23–27. Jul. 1982.

475. SZOKA, P.R. and EDGREN, R.A. Drug interactions with oral contraceptives: compilation and analysis of an adverse experience report database. Fertility and Sterility 49(5, Suppl.): 315–385. May 1988.

476. TALWAR, P.P., DINGFELDER, J.R., and RAVENHOLT, R.T. Increased risk of breakthrough bleeding when one oral-contraceptive tablet is missed. [Letter] New England Journal of Medicine 296(21): 1236–1237. May 26, 1977.

477. TAYOB, Y. and GUILLEBAUD, J. "Missed pill" conception: fact or fiction? [Letter] British Medical Journal 291(6488): 136–137. Jul. 13, 1985.

478. THAILAND. NATIONAL INSTITUTE OF DEVELOPMENT ADMINISTRATION (NIDA). RESEARCH CENTER, and MINISTRY OF PUBLIC HEALTH (MPH). NATIONAL FAMILY PLANNING PROGRAM, and MAHIDOL UNIVERSITY. INSTITUTE FOR POPULATION AND SOCIAL RESEARCH (IPSR). Thailand: summary report. [ENG, THA] [Bangkok], NIDA, and MPH, and IPSR, Apr. 1985. (Third Contraceptive Prevalence Survey) 29 p.

479. THAPA, S. A decade of Nepal's family planning program: achievements and prospects. Studies in Family Planning 20(1): 38–52. Jan.-Feb. 1989.

480. THAPA, S. (Family Health International) [Oral contraceptive use-effectiveness, Sri Lanka] Personal communication, May 1989.

481. THIERY, M., VAN KETS, H., and DEMOL, R. Clinical trial of a new oral contraceptive with a low oestrogen dosage: Restovar. Journal of International Medical Research 3(4): 279–283. 1975.

482. THOMAS, D.B., WHITEHEAD, A., and ROSEMAN, D. Invasive cervical cancer and combined oral contraceptives: WHO collaborative study of neoplasia and steroid contraceptives. British Medical Journal 290(6473): 961–965. Mar. 30, 1985.

* 483. TIKKANEN, M.J. and NIKKILÄ, E.A. Oral contraceptives and lipoprotein metabolism. Journal of Reproductive Medicine 31(9, Suppl.): 9. 898–905. Sep. 1986.

484. TOGO. UNIT OF DEMOGRAPHIC RESEARCH, UNIVERSITY OF BENIN (UOB), and DEMOGRAPHIC AND HEALTH SURVEYS (DHS). INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE. Enquete Démographique et de Santé au Togo 1988: rapport preliminaire. [Togo Demographic and Health Survey 1988: preliminary report.][FRE] Lomé, Togo and Columbia, Maryland, UOB and DHS, Feb. 1989. 15 p.

485. TOTH, A. Alternative causes of pelvic inflammatory disease. Journal of Reproductive Medicine 28(10, Suppl.): 699–702. Oct. 1983.

486. TREIMAN, K. and LISKIN, L. IUDs—a new look. Population Reports, Series B, No. 5. Baltimore, Johns Hopkins University, Population Information Program, Mar. 1988. 32 p.

487. TRUSSELL, J. and KOST, K. Contraceptive failure in the United States: a critical review of the literature. Studies in Family Planning 18(5): 237–283. Sep.-Oct. 1987.

488. TUNISIA. OFFICE NATIONAL DE LA FAMILLE ET DE LA POPULATION (NFP), and DEMOGRAPHIC AND HEALTH SURVEYS (DHS). INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE. Enquete demographique et de sante en Tunisie 1988: rapport preliminaire. [Tunisian Demographic and Health Survey 1988: preliminary report.][FRE] Tunis, Tunisia and Columbia, Maryland, NFP and DHS, Dec. 1988. 23 p.

489. TUOMALA, R.E. Gynecologic infections. In: Kistner, R.W. Gynecology principles and practice. 4th ed. Chicago, Year Book Medical Publishers, 1986. p. 667–695.

490. TZONOU, A., DAY, N.E., TRICHOPOULOS, D., WALKER, A., SALIARAKI, M., PAPAPOSTOLOU, M., and POLYCHRONOPOULOU, A. The epidemiology of ovarian cancer in Greece: a case-control study. European Journal of Cancer and Clinical Oncology 20(8): 1045–1052. Aug. 1984.

491. UGANDA. MINISTRY OF HEALTH (MOH), and DEMOGRAPHIC AND HEALTH SURVEYS (DHS). INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE. Uganda Demographic and Health Survey 1988–1989: preliminary report. [Kampala], Uganda and [Columbia], Maryland, MOH and DHS, Mar. 1989. 18 p.

492. UNITED KINGDOM. OFFICE OF POPULATION CENSUSES AND SURVEYS. Contraception, sterilisation and infertility. In: General Household Survey 1983. London, Her Majesty's Stationery Office, 1985. (Series GHS No. 13) p. 45–60.

493. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Levels and trends of contraceptive use as assessed in 1988. New York, UN, 1989. (Population Studies No. 110) 129 p.

494. UNITED STATES. AGENCY FOR INTERNATIONAL DEVELOPMENT, OFFICE OF POPULATION. Population: oral contraception and AIDS. [Telegram to AID worldwide] Jun. 1987. 1 p.

* 495. UTIAN, W.H. Oral contraceptive formulations—influence on user compliance and reliability of the method. Singapore Journal of Obstetrics and Gynaecology 15(1, Suppl.): 5–13. Mar. 1984.

496. VAN DE GIESSEN, G.J. Onderzoek Gezinsvorming 1982: voorlopige uitkomsten. [Netherlands Fertility Survey 1982: provisional results.][DUT, summary in ENG] Maandstatistiek van de Bevolking 31(4–5): 38–53. Apr.-May 1983.

497. VAN DER VURST, J. Anticonceptie in Vlaanderen. [Contraception in Flanders.][DUT] [Dissertation: Utrecht, Rijksuniversiteit, 1985]. p. 249–324.

498. VANDENBROUCKE, J.P. Pregnancy-associated alpha-glycoprotein: the link between "the pill" and rheumatoid arthritis? [Letter] Lancet 1(8322): 1046. May 7, 1983.

499. VAUGHAN, B., TRUSSELL, J., MENKEN, J., and JONES, E.F. Contraceptive failure among married women in the United States, 1970–1973. Family Planning Perspectives 9(6): 251–258. Nov.-Dec. 1977.

500. VESSEY, M. (University of Oxford) [Breast cancer and oral contraceptives] Personal communication, Jan. 3, 1989.

* 501. VESSEY, M., BARON, J., DOLL, R., MCPHERSON, K., and YEATES, D. Oral contraceptives and breast cancer: final report of an epidemiological study. British Journal of Cancer 47(4): 455–462. Apr. 1983.

502. VESSEY, M., DOLL, R., PETO, R., JOHNSON, B., and WIGGINS, P. A long-term follow-up study of women using different methods of contraception—an interim report. Journal of Biosocial Science 8(4): 375–427. Oct. 1976.

503. VESSEY, M., MCLAUFE, A., WELLS, C., MCPHERSON, K., WESTHOFF, C., and YEATES, D. Ovarian neoplasms, functional ovarian cysts, and oral contraceptives. British Medical Journal 294(6586): 1518–1520. Jun. 13, 1987.

* 504. VESSEY, M.P. Cancer and the pill—some recent findings. Journal of Obstetrics and Gynaecology 4(Suppl. 1): S52–S56. Jan. 1984.

505. VESSEY, M.P. Female hormones and vascular disease—an epidemiological overview. British Journal of Family Planning 6(Suppl.): 1–12. Oct. 1980.

506. VESSEY, M.P. Oral contraceptives and breast cancer. IPPF Medical Bulletin 21(6): 1–2. Dec. 1987.

507. VESSEY, M.P. and DOLL, R. Investigation of relation between use of oral contraceptives and thromboembolic disease. British Medical Journal 2(5599): 199–205. Apr. 27, 1968.

508. VESSEY, M.P. and DOLL, R. Investigation of relation between use of oral contraceptives and thromboembolic disease: a further report. British Medical Journal 2(5658): 651–657. Jun. 14, 1969.

509. VESSEY, M.P., LAWLESS, M., MCPHERSON, K., and YEATES, D. Neoplasia of the cervix uteri and contraception: a possible adverse effect of the pill. Lancet 2(8356): 930–934. Oct. 22, 1983.

* 510. VESSEY, M.P., LAWLESS, M., and YEATES, D. Oral contraceptives and stroke: findings in a large prospective study. British Medical Journal 289(6444): 530–531. Sep. 1, 1984.

* 511. VESSEY, M.P., LAWLESS, M., YEATES, D., and MCPHERSON, K. Progestogen-only oral contraception: findings in a large prospective study with special reference to effectiveness. British Journal of Family Planning 10(4): 117–121. Jan. 1985.

512. VESSEY, M.P., MCPHERSON, K., YEATES, D., and DOLL, R. Oral contraceptive use and abortion before first term pregnancy in relation to breast cancer risk. British Journal of Cancer 45(2): 327–331. Feb. 1982.

513. VESSEY, M.P., VILLARD-MACKINTOSH, L., and YEATES, D. Oral contraceptives, cigarette smoking, and other factors in relation to arthritis. Contraception 35(5): 457–464. May 1987.

514. VIHKO, R.K. and APTER, D.L. Steroids and the risk of breast cancer. Advances in Contraceptive Delivery Systems 2(2, 3): 198–207. Jun. 1986.

515. VIRTAVUO, T., PUNNONEN, R., KALLIO, H., MANNER, P., REHN, K., KANNEL, L., APAJALAHTI, E., and HUSA, L. A multicentre trial with a low-dosage combination type oral contraceptive. Pharmatherapeutica 1(8): 535–539. 1977.

516. VU, M.T. World population projections 1985: short- and long-term estimates by age and sex with related demographic statistics. Baltimore, Johns Hopkins University Press, 1985. 451 p.

517. WAHL, P., WALDEN, C., KNOPPE, R., HOOVER, J., WALLACE, R., HEISS, G., and RIFKIND, B. Effect of estrogen/progestin potency on lipid/lipoprotein cholesterol. New England Journal of Medicine 309(15): 862–867. Apr. 14, 1983.

518. WALDRON, T., ed. Do oral contraceptives increase risk of contracting HIV? Contraceptive Technology Update 9(12): 145–148. Dec. 1988.

519. WANG, E., SHI, S., CEKAN, S.Z., LANDGREN, B.-M., and DICZFALUSY, E. Hormonal consequences of "missing the pill." Contraception 26(6): 545–565. Dec. 1982.

520. WARREN, C.W., OBERLE, M.W., MEDICA, W., and MORRIS, L. Contraceptive use and fertility in Panama, 1984. International Family Planning Perspectives 13(2): 47–51. Jun. 1987.

521. WASHINGTON, A.E., GOVE, S., SCHACHTER, J., and SWEET, R.L. Oral contraceptives, Chlamydia trachomatis infection, and pelvic inflammatory disease: a word of caution about protection. Journal of the American Medical Association 253(15): 2246–2250. Apr. 19, 1985.

522. WAY, A.A., CROSS, A.R., and KUMAR, S. Family planning in Botswana, Kenya and Zimbabwe. International Family Planning Perspectives 13(1): 7–11. Mar. 1987.

523. WEIR, R.J., BRIGGS, E., MACK, A., NAISMITH, L., TAYLOR, L., and WILSON, E. Blood pressure in women taking oral contraceptives. British Medical Journal 1(5907): 533–535. Mar. 23, 1974.

524. WEISS, N.S., LYON, J.L., LIFF, J.M., VOLLMER, W.M., and DALING, J.R. Incidence of ovarian cancer in relation to the use of oral contraceptives. International Journal of Cancer 28(6): 669–671. Dec. 15, 1981.

525. WEISS, N.S. and SAYVETZ, T.A. Incidence of endometrial cancer in relation to the use of oral contraceptives. New England Journal of Medicine 302(10): 551–554. Mar. 6, 1980.

526. WENTZ, A.C. Dysmenorrhea, premenstrual syndrome, and related disorders. In: Jones, H.W., 3rd, Wentz, A.C., and Burnett, L.S. Novak's Textbook of Gynecology. 11th ed. Baltimore, Williams & Wilkins, 1988. p. 240–262.

527. WEST, C.P. The acceptability of a progestagen-only contraceptive during breast-feeding. Contraception 27(6): 563–569. Jun. 1983.

528. WILLETT, W.C., BAIN, C., HENNEKENS, C.H., ROSNER, B., and SPITZER, F.E. Oral contraceptives and risk of ovarian cancer. Cancer 48(8): 1684–1687. Oct. 15, 1981.

529. WINGRAVE, S.J. Reduction in incidence in rheumatoid arthritis associated with oral contraceptives. Lancet 1(8064): 569–571. Mar. 18, 1978.

530. WINGRAVE, S.J. and KAY, C.R. Oral contraceptives and gallbladder disease: Royal College of General Practitioners' Oral Contraception Study. Lancet 2(8305): 957–959. Oct. 30, 1982.

531. WINKELSTEIN, W., Jr. Smoking and cancer of the uterine cervix: hypothesis. American Journal of Epidemiology 106(4): 257–259. Oct. 1977.

532. WOLNER-HANSSEN, P. Akutt salpingitt og perivesjonemidler. [Acute salpingitis and contraceptive use.][NOR] Tidsskrift for den Norske Lægeforening 106(24): 1924–1926. Aug. 30, 1986.

533. WOLNER-HANSSEN, P., SVENSSON, L., MARDH, P.A., and WESTROM, L. Laparoscopic findings and contraceptive use in women with signs and symptoms suggestive of acute salpingitis. Obstetrics and Gynecology 66(2): 233–237. Aug. 1985.

534. WOODS, K.L. Oral contraception and cancer of the female reproductive system. Journal of Clinical and Hospital Pharmacy 10(2): 123–135. Jun. 1985.

535. WORLD HEALTH ORGANIZATION (WHO). World health statistics annual: 1985. [ENG, FRE] Geneva, WHO, 1985. 531 p.

536. WORLD HEALTH ORGANIZATION (WHO). DIVISION OF FAMILY HEALTH. Maternal mortality rates: a tabulation of available information. 2nd ed. Geneva, WHO, 1986. (FHE/86.3) 46 p.

537. WORLD HEALTH ORGANIZATION (WHO). DIVISION OF FAMILY HEALTH. The prevalence of nutritional anaemia in women in developing countries: a literature review. Geneva, WHO, 1979. (FHE/79.3) 118 p.

* 538. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION, and SPECIAL PROGRAMME ON AIDS. Report of a meeting on contraceptive methods and HIV infection. Geneva, WHO, Jun. 1987. 23 p. [Mimeo]

* 539. WORLD HEALTH ORGANIZATION. Genital human papillomavirus infections and cancer: memorandum from a WHO meeting. Bulletin of the World Health Organization 65(6): 817–827. 1987.

540. WORLD HEALTH ORGANIZATION. New strategies proposed for the study of breast cancer and the pill. Progress 8: 7–8. 1988.

* 541. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION, TASK FORCE ON ORAL CONTRACEPTIVES. A randomized, double-blind study of two combined two progestogen-only oral contraceptives. Contraception 25(3): 243–252. Mar. 1982.

542. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION, TASK FORCE ON SAFETY AND EFFICACY OF FERTILITY REGULATING METHODS. Report of meeting on breast cancer and oral contraceptives: Geneva, 27–28 Jun. 1988. 1988. 9 p. (Unpublished)

* 543. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION, TASK FORCE ON ORAL CONTRACEPTIVES. A randomized double-blind study of the effects of two low-dose combined oral contraceptives on biochemical aspects: report from a seven-centered study. Contraception 32(3): 223–236. Sep. 1985.

544. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION, TASK FORCE ON ORAL CONTRACEPTIVES. Effects of hormonal contraceptives on milk volume and infant growth. Contraception 30(6): 505–522. Dec. 1984.

* 545. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. A randomized, double-blind study of six combined oral contraceptives. Contraception 25(3): 231–241. Mar. 1982.

546. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME ON AIDS, and SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Contraceptive methods and human immunodeficiency virus (HIV). [Joint statement] Weekly Epidemiological Record 62(33): 244. Aug. 14, 1987.

547. WORLD HEALTH ORGANIZATION. TASK FORCE ON ORAL CONTRACEPTIVES, SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT, AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Effects of hormonal contraceptives on breast milk composition and infant growth. Studies in Family Planning 19(6): 361–369. Nov.-Dec. 1988.

* 548. WORLD HEALTH ORGANIZATION, and UNITED STATES NATIONAL ACADEMY OF SCIENCES. Summary and conclusions of the WHO/NAS Workshop and Meeting on Breast Feeding and Fertility Regulations: Current Knowledge and Programme Implications. [1982]. 24 p. (Unpublished).

549. WOUTERSZ, T.B. A new ultra-low-dose combination oral contraceptive. Journal of Reproductive Medicine 28(Suppl. 1): 81–84. Jan. 1983.

550. WOUTERSZ, T.B. Three and one-half years' experience with a lower-dose combination oral contraceptive. Journal of Reproductive Medicine 16(6): 338–344. Jun. 1976.

* 551. WYNN, V. Effect of progesterone and progestins on carbohydrate metabolism. In: Bardin C.W., Milgrom, E., and Mauvais-Jarvis, P., eds. Progesterone and progestins. New York, Raven Press, 1983. p. 395–410.

552. WYNN, V. and GODSLAND, I. Effects of oral contraceptives on carbohydrate metabolism. Journal of Reproductive Medicine 31(9, Suppl.): 892–897. Sep. 1986.

553. WYNN, V., GODSLAND, I., CROOK, D., and SIMPSON, R. Carbohydrate and lipid metabolism in users of fixed-dose, combined oral contraceptives containing levonorgestrel or desogestrel. [Text accompanying slide presentation] Oct. 1988. 22 p. (Unpublished).

554. WYNN, V., GODSLAND, I., SIMPSON, R., and CROOK, D. Carbohydrate and lipid metabolism in low-dose oral contraception. 1988. 24 p. (Unpublished)

555. WYNN, V. and NITHTHYANANTHAN, R. The effect of progestins in combined oral contraceptives on serum lipids with special reference to high-density lipoproteins. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 766–772. Mar. 15, 1982.

556. YUAN, J.-M., YU, M.C., ROSS, R.K., GAO, Y.-T., and HENDERSON, B.E. Risk factors for breast cancer in Chinese women in Shanghai. Cancer Research 48(7): 1949–1953. Apr. 1, 1988.

557. ZACHARIAS, S., AGUILERA, E., ASSENZO, J.R., and ZANARTU, J. Effects of hormonal and nonhormonal contraceptives on lactation and incidence of pregnancy. Contraception 33(3): 203–213. Mar. 1986.

558. ZADOR, G. and NILSSON, B. Clinical experience with a low-oestrogen, low-progestogen combined oral contraceptive: evaluation of a Swedish multicentre study. Pharmatherapeutica 1(7): 453–461. 1977.

559. ZARKOVIC, G. Alterations of cervical cytology and steroid contraceptive use. International Journal of Epidemiology 14(3): 369–376. Sep. 1985.

560. ZIMBABWE. DEPARTMENT OF CENSUS AND STATISTICS (ZDCS), and DEMOGRAPHIC AND HEALTH SURVEYS. INSTITUTE FOR RESOURCE DEVELOPMENT/WESTINGHOUSE (IRD/W). Zimbabwe Demographic and Health Survey 1988: preliminary report. [Harare], Zimbabwe and [Columbia, Maryland], ZDCS and IRD/W, Mar. 1989. 22 p.

ADDENDA

561. HONDURAS. MINISTRY OF PUBLIC HEALTH (MOH), and ASSOCIATION FOR FAMILY PLANNING IN HONDURAS (ASHONPLAFA), and MANAGEMENT SCIENCES FOR HEALTH (MSH), and FAMILY HEALTH INTERNATIONAL (FHI). Epidemiology and Family Health Survey Honduras, 1987: final report. [Tegucigalpa], Honduras, MOH and [Tegucigalpa], Honduras, ASHONPLAFA, and [Boston], MSH, and [Research Triangle Park, North Carolina], FHI, May 1989. 305 p.

562. MAZUR, A. Media coverage and public opinion on scientific controversies. Journal of Communication 31(3): 106–115. Summer 1981.

563. MITRA AND ASSOCIATES (MA). Bangladesh Contraceptive Prevalence Survey—1985: key tables. Dhaka, MA, 1985. 26 p.

564. SCHLESSELMAN, J.J., STADEL, B.V., MURRAY, P., and LAI, S. Breast cancer in relation to early use of oral contraceptives: no evidence of a latent effect. Journal of the American Medical Association 259(12): 1828–1833. Mar. 25, 1988.

565. SPELLACY, W.N., KALRA, P.S., BUHI, W.C., and BIRK, S.A. Pituitary and ovarian responsiveness to a graded gonadotropin releasing factor stimulation test in women using a low-estrogen or a regular type of oral contraceptive. American Journal of Obstetrics and Gynecology 137(1): 109–115. May 1, 1980.

566. VESSEY, M.P., MCPHERSON, K., VILLARD-MACKINTOSH, L., and YEATES, D. Oral contraceptives and breast cancer: latest findings in a large cohort study. British Journal of Cancer 59(4): 613–617. Apr. 1989.

POPULATION REPORTS IN PRINT

ORAL CONTRACEPTIVES—Series A
___ A-7 Lower-Dose Pills [1988]

INTRAUTERINE DEVICES—Series B
___ B-5 IUDs—A New Look [1988]

STERILIZATION, FEMALE—Series C
___ C-9 Minilaparotomy and Laparoscopy: Safe, Effective, and Widely Used [1985] *(F,P,S)*

STERILIZATION, MALE—Series D
___ D-4 Vasectomy—Safe and Simple [1983] *(F,P,S)*

LAW AND POLICY—Series E
___ E-6 Legal Trends and Issues in Voluntary Sterilization [1981] *(F,P,S)*
___ E-7 Laws and Policies Affecting Fertility: A Decade of Change [1984] *(A,F,P,S)*

BARRIER METHODS—Series H
___ H-7 New Developments in Vaginal Contraception [1984] *(A,F,P,S)*

FAMILY PLANNING PROGRAMS—Series J
___ J-22 Traditional Midwives and Family Planning [1980] *(F,P)*
___ J-23 Films for Family Planning Programs [1981] *(F,P,S)*
___ J-25 Population and Birth Planning in the People's Republic of China [1982] *(F,P,S)*
___ J-26 Sources of Population and Family Planning Assistance [1983] *(F, P, S)*
___ J-27 Healthier Mothers and Children Through Family Planning [1984] *(A,F,P,S)*
___ J-28 After Contraception: Dispelling Rumors About Later Childbearing [1984] *(A,F,P,S)*
___ J-29 The Impact of Family Planning Programs on Fertility [1985] *(F,P,S)*
___ J-30 Contraceptive Social Marketing: Lessons from Experience [1985] *(F,P,S)*
___ J-31 Operations Research: Lessons for Policy and Programs [1986] *(F,P,S)*
___ J-32 Radio—Spreading the Word on Family Planning [1986] *(F,P,S)*
___ J-33 Men: New Focus for Family Planning Programs [1986] *(F,P,S)*
___ J-34 Employment-Based Family Planning Programs [1987] *(F,P,S)*
___ J-35 Counseling Makes a Difference [1987] *(F,P,S)*
___ J-36 Counseling Guide [1987] *(F,P,S)*

INJECTABLES AND IMPLANTS—Series K
___ K-2 Long-Acting Progestins—Promise and Prospects [1983] *(F,P,S)*
___ K-3 Hormonal Contraception: New Long-Acting Methods [1987] *(F,P,S)*

ISSUES IN WORLD HEALTH—Series L
___ L-4 Infertility and Sexually Transmitted Disease: A Public Health Challenge [1983] *(F,P,S)*
___ L-7 Mothers' Lives Matter: Maternal Health in the Community [1988]

SPECIAL TOPICS—Series M
___ M-7 Migration, Population Growth, and Development [1983] *(F,P,S)*
___ M-8 Fertility and Family Planning Surveys: An Update [1985] *(F,P,S)*
___ M-9 Youth in the 1980s: Social and Health Concerns [1985] *(F,P,S)*

Population Information Program, The Johns Hopkins University, 527 St. Paul Place, Baltimore, Maryland 21202, USA

1. **Population Reports** in print in English are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $2.00 each; full set of reports in print, $35.00; with binder, $40.00 Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ❑, English ❑, French ❑, Portuguese ❑, Spanish ❑
3. Please type or print your name and mailing address clearly:

Family Name _____ Given name _____
Organization _____
Address _____
City _____ Postal code _____
Country _____

4. ❑ Send _____ copies of each future issue of **Population Reports.**
   ❑ I am already on the **Population Reports** mailing list.
   ❑ Please send me a binder (in developed countries, $7.00 for binder only)
   ❑ I do not want to receive **Population Reports** regularly.
5. Mail this form to address above.

POPLINE a computerized literature search service, offers bibliographic citations and abstracts on a specific subject or field of interest from a collection of more than 155,000 documents covering all aspects of family planning and population. **In developing countries** searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States** institutional or individual users can subscribe to POPLINE through the National Library of Medicine (NLM), Bethesda, MD 20209. **In other developed countries** searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below; a fee may be charged for these requests.

POPLINE is produced by the Population Information Program at The Johns Hopkins University in collaboration with the Center for Population and Family Health at Columbia University, *Population Index* at Princeton University, and the Carolina Population Center at the University of North Carolina at Chapel Hill. POPLINE production is funded primarily by the United States Agency for International Development and by the National Institute of Child Health and Human Development. The CD-ROM version of POPLINE is funded by the United Nations Population Fund.

To request a search, please complete the following form:

Search topic _____
Purpose _____
Family Name _____ Given name _____ Organization _____
Address _____ City and postal code: _____ Country: _____

Mail this form to either of these addresses ☛ **Services to developing countries free of charge.**

Population Information Program
Attn: POPLINE
The Johns Hopkins University
527 St. Paul Place
Baltimore, Maryland 21202, USA

Center for Population and Family Health
Library/Information Program
Columbia University
60 Haven Avenue
New York, New York 10032, USA